Karnatak Arts,Science & Commece College,Bidar

B.Sc. Mathematics Program Outcomes:

1. Bachelor's degree in mathematics is the culmination of in-depth knowledge of algebra, calculus, geometry, differential equations and several other branches of mathematics. This also leads to study of related areas like computer science , statistics and mechanics . Thus, this programme helps learners in building a solid foundation for higher studies in mathematics.
2. The skills and knowledge gained has intrinsic beauty, which also leads to proficiency in analytical reasoning. This can be utilised in modelling and solving real life problems.
3. Students undergoing this programme learn to logically question assertions, to recognize patterns and to distinguish between essential and irrelevant aspects of problems. They also share ideas and insights while seeking and benefitting from knowledge and insight of others. This helps them to learn behave responsibly in a rapidly changing interdependent society.
4. Students completing this programme will be able to present mathematics clearly and precisely, make vague ideas precise by formulating them in the language of mathematics, describe mathematical ideas from multiple perspectives and explain fundamental concepts of mathematics to non-mathematicians.
5. Completion of this programme will also enable the learners to join teaching profession in primary a secondary schools and higher school.
6. This programme will also help students to enhance their employability for government jobs, jobs in banking, insurance and investment sectors, data analyst jobs and jobs in various other public and private enterprises.
7. Apply the underlying unifying structures of mathematics (i.e. sets, relations and functions, logical structure) and the relationships among them
8. Demonstrate proficiency in writing proofs
9. Communicate mathematical ideas both orally and in writing
10. Investigate and apply mathematical problems and solutions in a variety of contexts related to science, technology, business and industry, and illustrate these solutions using symbolic, numeric, or graphical methods.

Courses / PO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
Algebra	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Calculus	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Real analysis	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Differential equation	✓	✓	✓		✓	✓	✓	✓	✓	✓
Complex analysis	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Graph theory	✓		✓	✓	✓	✓	✓	✓	✓	✓
Numerical analysis	✓		✓	✓	✓				✓	✓
Linear algebra	✓	✓	✓	✓	✓	✓		✓	✓	✓
Laplace transformation	✓	✓	✓	✓		✓	✓	✓	✓	✓
Fourier series and harmonic analysis	✓	✓	✓	✓		✓	✓	✓	✓	✓
Boolean algebra and lattices	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Vector calculus	✓		✓		✓	✓	✓	✓	✓	✓
Operational research	✓		✓	✓		✓	✓		✓	✓
Statistics	✓	✓	✓	✓	✓	✓	✓		✓	✓

Course Outcome of B. Sc. Mathematics

Course Outcome of Linear Algebra Students will able to

• Define Vector Space, Quotient space Direct sum, linear span and linear independence, basis and inner product.

• Discuss the linear transformations, rank, nullity.

• Find the characteristic equation, eigen values and eigen vectors of a matrix.

• Prove Cayley- Hamilton theorem, Schwartz inequality, Gramschmidt orthogonalisation process.

• Solve the system of simultaneous linear equations.

Course Outcome of Numerical Analysis

Students will able to

• Define Basic concepts of operators Δ,E, ∇

• Find the difference of polynomial

• Solve problems using Newton forward formula and Newton backward formula.

• Derive Gauss's formula and Stirling formula using Newton forward formula and Newton backward formula.

• Find maxima and minima for differencial difference equation

• Derive Simpson's 1/3 ,3/8 rules using trapezoidal rule

• Find the solution of the first order and second order equation with constant coefficient

• Find the summation of series finite difference techniques

• Find the solution of ordinary differential equation of first by Euler,Taylor and Runge-Kutta methods

Course Outcome of Graph Theory

Students will able to

• Describe the origin of Graph Theory.

• Illustrate different types of graph theory.

• Explain matrix representation of a graph and some basic theorems.

• Discuss degree sequences and operations on graphs.

• Explain connectedness and components and some theorems.

• Characterize tree.

• Derive some properties of planarity and Euler's formula.

• Find chromatic number and chromatic polynomials for graphs.

Course Outcome of Modern Algebra

Students will able to

• Define subgroup, center, Normalizer of a subgroup.

• Find cycles and transpositions of a given permutations.

• Prove Lagrange's theorem ,Euler's theorem and Fermats theorem

• Define cyclic groups .

• Prove a group has no proper subgroup if it is cyclic group of prime order.

• Define normal subgroups , quotient groups and index of a subgroup.

• Define homomorphism ,kernel ofa homomorphism,isomorphism.

• Prove Cayley's theorem , the fundamental theorem of homomorphism for groups

• Define rings , zero divisors of a ring , integral domain , field and prove theorems

Course Outcome of Integral Calculus and Fourier Series

Students will able to

• Solve Basic Integral Calculus problems.

• Explain properties of definite integrals.

• Prove reduction formulae and solve some problems by using this formulae.

• Evaluate double and triple integrals.

• Apply change variable method to find the value of double and triple integral.

• Explain properties of Beta functions.

Course Outcome of Sequence and Series

Students will able to

• Define different types of sequence.

• Discuss the behaviour of the geometric sequence.

• Prove properties of convergent and divergent sequence.

• Verify the given sequence in convergent and divergent by using behaviour of Monotonic sequence.

• Prove Cauchy's first limit theorem, Cesaro's theorem, Cauchy's Second limit theorem.

• Explain subsequences and upper and lower limits of a sequence.

• Give examples for convergence, divergence and oscillating series.

• Discuss the behaviour of the geometric series.

• Prove theorems on different test of convergence and divergence of a series of positive terms.

• Verify the given series is convergent or divergent by using different test.

Course Outcome of Complex Analysis

Students will able to

• Compute sums, products, quotients, conjugate, modulus, and argument of complex numbers.

• Calculate exponentials and integral powers of complex numbers.

• Write equation of straight line, circle in complex form

• Define reflection points, concyclic points, inverse points

• Write the bilinear transformation which maps real line to real line, unit circle to unit circle, real line to unit circle. • Find parametrizations of curves, and compute complex line integrals directly.

• Use Cauchy's integral theorem and formula to compute line integrals.

• Represent functions as Taylor, power and Laurent series. • Classify singularities and poles.

• Find residues and evaluate complex integrals, real integrals using the residue theorem.