Semester	5
Course	Minor
Paper Code	B3MT230511T
Paper Title	Algebra-1 & Analysis-1
No. of Credits	4
Theory /	Theory
Practical /	·
Composite	
Minimum	4
No. of	
preparatory	
hours per	
week a	
devote	
Number of	Nil
Modules	
Syllabus	Algebra-1:[32]
	Complex Numbers[10] : Representation Modulus-Amplitude form Triangle
	inequality, De Moivre's theorem and its applications (6), Definition and problems on e^{ix} , Log Z, SinZ, Cos Z, a^{z} (4)
	Polynomials [12]: Fundamental Theorem of Classical Algebra (statement only). Nature of roots of an equation (surd or complex roots occur in pairs), Statement of Descartes' rule of signs and its applications(3). Statement of Bolzano's theorem on continuity in case of polynomials. Relation between roots and coefficients(3). Symmetric functions of roots(1). Transformations of equations (2). Cardan' s method of solving a cubic & Ferrari's method for a biquadratic equation(3).
	Set Theory & Binary Relations [6]: Cartesian product of sets, Relations on a set. Reflexive, symmetric and transitive properties of a relation on a set(3). Equivalence relations, equivalence class& partitions- illustrative discussions (3).
	Mappings [4]: Injective, surjective and bijective mappings. Composition of mappings, Invertibility of mappings (4)
	Analysis-1: [20]
	Real numbers [3]: Bounded sets of real numbers: their sup. and inf.,Statement of Least upper bound axiom, Density of rationals and irrationals in real number system, Archimedean property[3]
	Sequence[7]: Definition, Bounded& unbounded sequence, Monotone sequence(2) Limit of a sequence & its uniqueness .statement of limit theorems(2). Statement of Monotone Convergence Theorem and its applications-definition of e (2) Statement of Cauchy's General Principle of convergence and its applications(1).

	 Series of real numbers [7]: Definition of Convergent and divergent series: examples. Cauchy's principle as applied to infinite series (application only).Necessary condition of convergence. Statement of convergence of Geometric series and p-series (3). Statement of tests of convergence of series of positive terms: Comparison Test, Ratio Test, Cauchy's Root Test. Raabe 's test— applications (3). Alternating series: statement of Leibnitz Test and its applications(1). Limit of Real valued functions[3]: limit of a function (ε –δ definition, and Cauchy's definition) criterion and Sequential criteria. Algebra of limits.
Learning Outcomes	 On successful completion of the course a student will be able to do the following: Getting introduced to complex number and complex trigonometric functions. Handling roots of polynomial equations and solving polynomial equations. Introduction to concept of sets with reference to abstract nature of mathematics. Understanding real numbers through series and sequences. Will be able to understand the Axiomatic development of real numbers and embark into mathematical philosophy.
Reading/Ref erence Lists	 Introduction to Real Analysis: Bartle & Sherbert Calculus(Vol-1): T.M.Apostol Mathematical Analysis: Malik & Arora Classical Algebra: S.K.Mapa Higher Algebra: Abstract and Linear: S.K.Mapa An Introduction to Analysis (Differential Calculus(Part-1)): Maity & Ghosh
Evaluation Paper Structure for Theory Semester Exam	End Sem; 70CIA:30(20(MidSem)+5(Assignment))+5(Attendance))7 questions each carrying 10 marks out of 13/14 questions.