1.	Title of the course	Advanced Algebra
2.	Course number	MA702L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To MA7105/7
6.	To be offered by	Department of Mathematics and Statistics
7.	To take effect from	July 2022
8.	Prerequisite	Nil
9.	**Course Objective(s):** To recall some of the required topics in Linear Algebra and Abstract Algebra. To Introduce structures of different Groups, Rings and Fields. Using these notions to study important theorems like Chinese remainder theorem for rings and to study different types of Field extensions.	
10.	**Course Content:** Vector Spaces, Linear Transformation, Canonical Forms, Diagonalization, Inner Product Spaces, Gram-Schmidt Process, Spectral Theorem. Algebra: Groups, Subgroups and Factor Groups, Lagrange's Theorem, Homomorphisms, Normal subgroups, Quotients of Groups, Symmetric groups, Matrix groups, group of rigid motions of the plane and finite group of motions. Cyclic groups, generators and relations, Cayley's theorem, group actions, Sylow theorems. Direct products, Structure theorem for finite abelian groups, Simple groups and solvable groups, Nilpotent groups, simplicity of alternating groups, Composition series, Jordan-Holder theorem, Semidirect products, Free groups, Free abelian groups. Rings, Examples (including polynomial rings, formal power series rings, matrix rings and group rings), ideals, prime and maximal ideals, rings of fractions, Chinese Remainder theorem for pairwise comaximal ideals. Introduction to Fields: Brief discussion on Fields, Characteristics and prime subfields, Field extensions, Finite, algebraic and finitely generated field extensions, Classical, ruler and compass constructions, Splitting fields and normal extensions, algebraic closures, Finite fields, Cyclotomic fields,	
11.	**Textbook(s):** 1. Dummit D S, *Foote R M, Abstract Algebra*, Wiley (2003). 2. Hoffman K, and Kunze R, *Linear Algebra*, Prentice Hall India (1978).	
12.	**Reference(s):** 1.Jacobson N, Basic algebra I, Dover publications (2009). 2. Lang S, Algebra, Springer-Verlag (2002). 3. Herstein I N, *Topics in Algebra*, Wiley (2006). 4. Artin M, *Algebra*, Pearson (2010).	