Details of Course

Course Title	Course Structure			Pre-Requisite
MC 207 : Modern Algebra	L 3	T 1	P 0	Basic knowledge of set theory

Course Objective: To impart the knowledge of algebraic structure of Groups, Rings, Integral Domains and Fields.

Course Outcome (CO):

CO1	Identify different algebraic structures like groups, rings, fields etc. and to apply them in various science related problems.
CO2	Apply concepts of abstract algebra with various scientific tools to evolve new ideas to solve practical problems.
CO3	Demonstrate problem solving skills in the context of abstract algebra topics through consideration of examples, pattern exploration, conjecture, proof construction, and generalization of results.
CO4	Apply algebraic concepts such as groups and ring theory to model, analyze and solve real-world problems.
CO5	Comprehend abstract definitions and theorem statements by building examples and non-examples of definitions, and drawing conclusions using definitions and theorems given mathematical information.

S. No.	Contents	Contact hours
1.	Groups, Abelian groups, Subgroups, Centre of a group, Order of a group and an element, Cyclic groups, groups of prime order. Cayley's digraph of cyclic groups.	08
2.	Permutation groups, Alternating subgroup, Important examples of groups such as S3(Symmetric group of order 6), K4 (Klein's 4 –group) and Q8 (Quaternion group) groups. Cosets, Lagrange's Theorem for finite groups, Normal subgroup, Quotient group.	09
3.	Group Homomorphism, Isomorphism, Kernel of group homomorphism, Fundamental theorem of group homomorphism, Cayley's theorem.	09
4.	Ring, Subring, Integral domain, Field, Ideal of a ring, Quotient ring, Ring homomorphism, Isomorphism, and some elementary properties.	08
5.	Prime ideal, Maximal ideal, Ring of polynomials and their properties.	08
	Total	42

Suggested Books:

S. No.	Name of Books/Authors/Publishers	Year of Publication
1	Joseph A. Gallian, Contemporary Abstract Algebra (10^{th} Edition), Narosa Publishing House.	2021
2	N. S. Gopalakrishnan, University Algebra, New Age International Publishers.	2004
3	I. N. Herstein, Topics in Algebra (2^{nd} Edition), Wiley Eastern Limited	2006
4	Khanna and Bhamri, A course in Abstract Algebra (5^{th} Edition), Vikas Publishing House.	2017
5	D. S. Dummit and R. M. Foote, Abstract Algebra (3^{rd} Edition), John Wiley and Sons.	2011