

Subject Name: Number Theory And Algebraic Structures					
Paper Code: MATH 2201					
Contact Hours per week	L	T	P	Total	Credit Points
	3	1	0	4	4

MODULE-I - NUMBER THEORY, POSETS AND LATTICES (12L)

Well Ordering Principle, Divisibility theory and properties of divisibility, Fundamental Theorem of Arithmetic, Euclidean Algorithm for finding greatest common divisor (GCD) and some basic properties of GCD with simple examples.

Congruences , Residue classes of integer modulo n (Z_n) and its examples.

Order , Relation and Lattices, POSET , Hasse Diagram. Minimal, Maximal, Greatest and Least elements in a POSET, Lattices and its properties, Principle of Duality, Distributive and Complemented Lattices.

MODULE-II- GROUP THEORY I (12L)

Cartesian Product , Binary operation , Composition Table.

Group , Elementary theorems on groups, Quasi group and Klein's 4 group.

Permutations , Product of permutations, Group property of permutations, Cyclic permutation , Transposition , Even and Odd permutations, Proposition regarding permutations , Alternating Groups , Dihedral groups.

Discussion on some physical examples e.g. the motion group of a cube.

MODULE-III – GROUP THEORY II (12L)

Order of an element of a group , Properties of the order of an element of a group , Subgroups , some basic theorems on subgroups, Cyclic group , Cosets , Lagrange's theorem, Fermat's Little Theorem(statement only).

Normal subgroup, some basic theorems on Normal subgroup, Quotient group , some applications in algebraic coding theory e.g. Block codes , Linear codes , Coset decoding etc.

MODULE-IV- MORPHISMS, RING AND FIELD (12L)

Homomorphism and Isomorphism of groups, some basic theorems.

Rings , some elementary properties of a ring, Ring with unity , Characteristic of a ring, Ring with zero divisors, Subring , Integral domain, Field , Division Ring or Skew Field.(Emphasis should be given on examples and elementary properties.)

References:

1. Higher Algebra, S.K.Mapa, Sarat Book Distributors
2. Advanced Higher Algebra, J.G. Chakravorty and P.R. Ghosh, U.N. Dhur and Sons
3. A First course in Abstract Algebra, J.B.Fraleigh, Narosa
4. Algebra, M.Artin, Pearson
5. Discrete Mathematics and its Applications, Kenneth H Rosen, McGraw Hill
6. Discrete Mathematics For Computer Scientists And Mathematicians

[Joe R. Mott](#) , [Abraham Kandel](#) and [Theodore P. Baker](#), Prentice-Hall Of India

7. A Friendly Introduction to Number Theory, Joseph H Silverman, Pearson
8. Topics in Algebra, I.N.Herstein, Wiley India
9. Advanced Algebra, [Samuel Barnard](#) and [James Mark Child](#), Macmillan

Subject Name: Probability and Numerical Methods					
Paper Code: MATH 2202					
Contact Hours per week	L	T	P	Total	Credit Points
	3	1	0	4	4