**MA-633 COMMUTATIVE SEMIGROUP RINGS (3 Credits)**

**Commutative Rings:** Definition and examples, Integral domains, unit, irreducible and prime elements in ring, Types of ideals, Quotient rings, Rings of fractions, Ring homomorphism, Definitions and examples of Euclidean Domains, Principal ideal domains and Unique Factorization domains. Definition and Examples of DVRs, Dedekind and Krull Domains.

**Commutative Semigroups:** Basic notions, Cyclic Semigroups, Numerical Monoids,Ordered Semigroups, Congruences, Noetherian Semigroups, Factorization in Commutative Monoids.

**Semigroup Ring and its Distinguished Elements:** Introduction of Polynomial Rings in one indeterminate including its elements of distinct behaviours, Structure of Semigroup ring, Zero Divisors, Nilpotent Elements, Idempotents, Units.

**Ring Theoretic Properties of Monoid Domains:** Integral Dependence for Domains and Monoid Domains, Monoid Domains as Factorial Domains, Monoid Domains as Krull Domains, Divisor Class Group of a Krull Monoid Domain.

**RECOMMENDED BOOKS:**


1. M. F. Atiyah and I. G. Macdonald, Introduction to Commutative Algebra, Addison Wesley Pub. Co., 1969.
2. R. Gilmer, Multiplicative Ideal Theory, Marcell Dekker, New York, 1972.
3. H. Matsumura, Commutative Ring Theory, Cambridge University Press, 1986.
4. R. Gilmer, Commutative Semigroup Rings, The University of Chicago Press, Chicago, 1984.