MA 535: Rings And Modules (3-1-0:4)

Basic concepts of rings,ideals, matrix rings, polynomial rings, direct products of rings, fields and division rings, domains, regular rings, idempotent and nilpotent elements in a ring. Modules, submodules, operation on submodules, large and small submodules, radical of a module.

Homomorphism of modules, isomorphism theorems, exact sequences, direct sums and direct products of modules, external and internal direct sums, direct summands.

Free modules and projective modules, torsion free and torsion modules over commutative domains, exact sequences and projectivity.

Tensor product of modules, flat modules, injective modules,injectivity and divisibility over domains, exact sequences and injectivity, Baer's theorem.

Simple modules, semisimple modules,socle of a module,semisimple rings,Schur'slemma,equivalent conditions for semisimple modules,Wedderburn structure theorem.

Text Books and References:

1. I. T. Adamson, "Elementary Rings and Modules", Oliver and Boyd Publisher
2. N. Jacobson, "Basic Algebra II", Dover Publications Inc
3. S. Lang, "Algebra", Springer Science & Business Media
4. I. S. Luthar and I. B. S. Passi, "Algebra, Vol. 2: Rings", Narosa Publishing House
5. J. J. Rotman, "An Introduction to Homological Algebra", Springer