DEPARTMENT OF MATHEMATICS,

UNIVERSITY OF KARACHI,

Course Outline

MATH 601: ABSTRACT ALGEBRA

Course contents:

Group Theory: Groups, Subgroups, cyclic groups, normal subgroups, quotient groups, examples. Homomorphism of groups, the fundamental theorem of homorphism. Isomorphism of groups, the isomorphism theorems. Direct product of groups. Internal and external direct products. Finitely generated Abelian groups. Generators and torsion. The fundamental theorem of F.G. Abelian groups. Applications. Group action on a fixed sets and isotropy subgroups, orbits. Sylow theorems, p-groups. First, second and third Sylow theorems. Application of the Sylow theory. RING THEORY: Rings. Integral domain. The characteristic of a ring. Fermat's and group algebra. Quotient rings, ideals, maximal and prime ideals. Ring homomorphism: Definition, properties, prime fields. Fundamental theorems of homorphism and isomorphism. Polynomial rings, the evaluation modules, ideals, Isomorphism theorem. Near rings, subnear rings, near ring modules, isomorphism theorem.

Books Recommended:

1. Fraleigh, J. B., A First Course in Abstract Algebra, Third Edition, Addison Wesley Publishing Co., 1982.
2. Allenby, R. B. J. T., Rings, Fields and Groups An Introduction to abstract Algebra, Edward Arnold Ltd., 1983.
3. Burnisde, W., Theory of Groups of Finite Order, Second Edition, Dover, N.Y., 1955.
4. Hall, M. Nesbitt, C. J. and Thrall, R. H., Rings with Minimum Conditions, Ann Arbor, Univ. of Michigan Press, 1944.
5. Artin, E., Nesbitt, C. J. and Thrall R. H., Rings with Minimum Conditions, Ann Arbor, Univ. of Michigan Press, 1944.
6. Mecoy, N. H., Rings and Ideals, Cerus Monograph No.81 Buffalu, The Mathematical Association of America.
7. Stewart, J. N., Galois Theory, Chapman and Hall, London, 1973.
8. Artin, E., Galois Theory, University of Notre Dam Press, Indiana, 1964.
9. Garling, D. J. H., A Course in Galois Theory, C.U.P., 1986.
10. Adamson, I. T., Introduction to Field Theory, Oliver and Boyd, 1964,

11. Albert, A A., Studies in Modern Algebra, Mathematical Association of America, 1963.
12. Gaal, L., Classical Galois Theory with Examples, Markham, Chicago, 1971.
13. Hadlock, C. R., Field Theory and its Classical Problems, Carus Monograph, Mathematical Association of America, 1978.