PROF. S VISWANATH
Department of Mathematics
The Institute of Mathematical Sciences, Chennai

PROF. AMRITANSHU PRASAD
Department of Mathematics
The Institute of Mathematical Sciences, Chennai

PRE-REQUISITES : BSc-level linear algebra

INTENDED AUDIENCE : Any interested learners

COURSE OUTLINE :

Foundational PG level course in Algebra, suitable for M.Sc and first year PhD students in Mathematics.

ABOUT INSTRUCTOR :

Prof. S. Viswanath is a faculty at The Institute of Mathematical Sciences, Chennai. His research interest is in representation theory.

Prof. Amritanshu Prasad is a faculty at The Institute of Mathematical Sciences, Chennai. His research interest is in representation theory.

COURSE PLAN :

Week 1: Permutation groups, group axioms, order and conjugacy, subgroups
Week 2: Group actions, homomorphisms, isomorphisms, quotient groups, products

Week 3: Orbit counting theorem, fixed points, Sylow's theorems
Week 4: Sylow's theorems (continued), free groups

Week 5: Generators and relations

Week 6: Rings, Euclidean domains, ideals and factorization
Week 7: Examples of commutative and non-commutative rings, quotients by ideals

Week 8: Tensor and exterior algebras, modules
Week 9: Sums, quotients and homomorphisms of modules

Week 10: Free modules, determinants, primary decomposition
Week 11: Finitely generated modules and the Noetherian condition

Week 12: Smith form, structure theorem for finitely generated modules over a PID, Jordan canonical form