

Background material you should know MATH 629-Homological Algebra

The prerequisite for this class is the equivalent of MATH 621. Specifically, here is a list of topics from that course that you need to be familiar with.

- The fundamentals of ring theory:
  - Commutative and noncommutative rings (including PIDs, matrix rings and polynomial rings).
  - Ring homomorphisms and ideals.
  - One-sided ideals (in noncommutative rings).
- Modules over a ring
  - Module homomorphisms.
  - Submodules.
  - Factor modules.
  - Free modules (?) I will need to review this topic!
  - Direct sum and product of modules.

Towards the end of the semester, we will concentrate on commutative rings. At that point students will need to recall the notions of prime ideals, and localization at a multiplicatively closed set. However, I will go over these topics a bit when needed. Of course the more mathematics you have had, particularly the more algebra you have had, the better off you will be.