

Spring 2008, Course 18.706: Noncommutative algebra

TR 11-12.30, Rm. 2-102

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The goal of this course is to give an introduction to the structure theory of noncommutative algebras and modules over them. The topics to be covered are:

1. Idempotents, Peirce decomposition, simple and semisimple algebras, Wedderburn's theorem. Density theorem, Jordan-Hölder theorem, Krull-Schmidt theorem. Finite dimensional algebras.
2. Projective and injective modules, Morita equivalence.
3. Localization and Goldie's theorem.
4. Central simple algebras and the Brauer group.
5. Maximal orders.
6. Irreducible representations, polynomial identity rings, invariant theory.
7. Growth of algebras, Gelfand-Kirillov dimension.

We will use M. Artin's notes which can be found at www-math.mit.edu/~etingof and cover most of this material.

To officially pass the course, it will be required to solve homework assignments which will be assigned on Thursdays and due the following Thursday.