

Spring 2022, Math 6510: An introduction to the Modular Character Theory of Finite Groups.

Character theory is an exceptionally powerful tool for the study of finite groups. Complex (ordinary) character theory of a finite group focuses on characters that are associated to finite dimensional linear representations where the field of definition is the complex numbers or, more generally, a field of characteristic zero.

When the characteristic of the field divides the order of the finite group, the situation is quite different. This is the focus of modular character theory. Just as with ordinary character theory, there are very powerful theorems whose proof depends heavily on the theory of modular characters.

Our class will include an introduction to some key results in ordinary character theory, and then will build on these to develop a coherent introduction to the theory of modular characters of finite groups.

I will almost certainly record a few introductory videos on the use of the GAP (Groups, Algorithms and Programming) software system at some point to show how it can aid in the study of group characters, both modular and ordinary.

There will not be a required book for the class. I will be posting notes as I go along. However, I expect to follow Gabriel Navarro's outstanding book "Characters and Blocks of Finite groups".

In terms of prerequisites, the first 5 weeks or so will likely be a whirlwind introduction (or reintroduction) to the ordinary character theory. I will post additional notes for this material from a course I taught during Spring 2019.

In terms of prerequisites, successful completion of Math 5520-30 is ideal. However, if you have completed Math 5520 but not Math 5530, you should speak to me regarding whether or not you should be signing up.