

MATH 6510
spring 2022
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General Course Information

- This course is intended to serve as an introduction to the **modular** character theory of finite groups.
- We will begin with a review of the ordinary (complex) character theory of finite groups.
- At that point, we will begin our formal study of the modular character theory of finite groups.
- My emphasis will be on how to utilize character theoretical (and sometimes representation theoretical) information about a group in order to determine structural information about that particular group.
- I also hope to have a lecture (or two) in which I will introduce the use of GAP4 for character theoretical computations in finite groups. In all likelihood, these will be recorded and uploaded as instructional videos for those interested in the use of GAP4.
- I will be uploading lecture notes on the course Canvas page. This will provide greater flexibility during class time, and allow you to focus on the material.
- While my notes will follow Gabriel Navarro's book (see below), I will often add topics and examples here and there, and will sometimes digress significantly from this book.

Possible Reference Sources:

(1) Some references in character theory/representation theory:

- (i) *Characters and Blocks of Finite Groups*, by Gabriel Navarro. At least for a while, I expect to follow the outline of this excellent book.
- (ii) *Character Theory of Finite Groups*, by I. Martin Isaacs. It's a great book that is now published by Dover (I think). So it can be had for very little money. While the focus of the books is ordinary character theory, Chapter 15 is a very brief introduction to modular character theory.

(2) For group theory:

- (i) *Finite Groups*, by Daniel Gorenstein.
- (ii) *An Introduction to the Theory of Groups*, by Joseph Rotman.
- (iii) *A Course on Group theory*, by John Rose.
- (iv) *Finite group theory*, by M. Aschbacher.

(3) For general algebra:

- (i) *Rings, Modules and Linear Algebra*, by B. Hartley and T.O. Hawkes.
- (ii) *Noncommutative Rings*, by I.N. Herstein.
- (iii) *Algebra*, by Thomas Hungerford.

Grading Policy

The grade that you earn for this course will be based on attendance and participation. Specifically,

- (a) that you attend “most” of the lectures (see below);
- (b) that you contribute to the class notes by doing some nominal “proof reading” of the posted lecture notes.

My plan is to ask each student to proof read roughly 15-20 pages of notes over the course of the semester. You’ll read through those notes carefully and report any issues, necessary corrections, and the like to me. I will make those changes, and update the posted notes as the semester progresses.

At the end of the semester, I’ll total up all *unexcused absences*. If x is that number, and if you have contributed to the proof reading as described above, then I will assign grades as follows:

$0 \leq x \leq 3$	.....	A
$4 \leq x \leq 7$	.....	B
$8 \leq x \leq 12$	.....	C
$12 \leq x \leq 15$	.....	D
$15 \leq x$	.....	F

If you know you have to miss class, or if you missed class because of illness, emergency, or personal matters (you needn’t explain in detail), just let me know in person or (preferably) by email. Any such absences will not count against the your attendance. As you have no doubt heard me say, *Life happens, even when you’re a graduate student!*

If, at the end of the semester, you should find that your grade is not what you might like, then you may attempt to improve your grade by writing up and turning in exercises **of my choice**. Your grade will then be adjusted according to how well the problems are done. I will say more about the specifics should the need arise.

In compliance with the *Americans with Disabilities Act*, I include the following:

The University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with an accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request accommodations at any time, however, ODA notices of accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of accommodation for every semester and must meet with each faculty member prior to implementation in each class. For additional information see the Office of Disability Accommodation website at

<https://studentaffairs.unt.edu/office-disability-access>

You may also contact them by phone at 940.565.4323.