Name: Charles Daly   **Math 1540 Spring 2022**

When & Where: TuTh 10:30 AM (EST) - 11:50 AM (EST)   **Barus & Holley 161**

Canvas Site: https://canvas.brown.edu/courses/1087864

Email: charles_daly@brown.edu

Office Hours: Tu 4:00 - 5:00 PM & Wed 3:00 PM - 4:00 PM at 309 Kassar House

Course Description: This course is largely concerned with Galois Theory. Drawing from the course textbook, *Rotman's Galois Theory*, the subject is an interplay between polynomials, fields, and groups. The course will assume decent exposure to group theory, linear algebra, and ring theory. The first meeting of the course, **Jan 27th**, will begin with the *Classical Formulas* section of the text and serve as a motivator for the subject and **will be held on Zoom**. The remaining classes are intended to be held in person. Ambitiously, we intend to get to the *Applications* section of the text, and in the process cover the standard material about field extensions, splitting fields, the Galois Group, etc. The second half of the course will be a survey of some material in Module Theory. I haven't assigned a text for this half and will likely just post my own notes, but *Dummit and Foote's Algebra* is a great reference outside of the provided material.

Grading: Your grade will be determined by homework, and two exams: the midterm and final. The homework, midterm, and final are worth 35%, 30%, and 35% of your grade respectively.

Homework: There will be a total of ten homework assignments that will be assigned every week and half or so and will consist of problems assigned from the text. Specific problems will be posted on our Canvas site. **No late homework is allowed.** You are allowed to form study groups and discuss the homework together, in fact I encourage this, but only after you attempt the homework yourself. You should engage with the problems on your own before discussing them with others.

Exams: The midterm is yet to be determined, but will ideally take place around Week 7, March 8th - March 10th. We will likely hold the midterm in the evening, in-class, to allow a generous amount of time. The exam itself will not be lengthier. The extended time period will be provided to remove the stress surrounding the time constraint. The final will be a in-class three hour cumulative exam on **May 19th at 2:00 PM (EST)**. If you need to miss either the midterm or final due to a university recognized excuse, with documentation, we will figure out a suitable make-up assignment.

Textbook: The textbook is *Rotman's Galois Theory* which is available in the university book store. You are encouraged to check out other texts if you like. The second half of the course is concerned with modules, where I will be largely drawing from *Dummit and Foote's Algebra*. This text is not necessary for the course, but you are welcome to use this, or whatever other text you like to supplement our class notes.

Recordings and Covid-19 Policies: Given the Covid-19 pandemic, I am going to try and ensure all lectures are recorded. I have been told our classroom is equipped with a camera and speaker to adequately record lectures. This is done to ensure people who need to isolate, or miss class for another reason, may still participate in class and access our content. In addition, please ensure you are following Brown University guidelines regarding the Covid-19 pandemic. More information can be found here.

Accommodations: If you have an exam accommodation approved by Student Accessibility Accommodations, you must let me know at least one week before the exam. Please contact me directly through email or Canvas.

Academic Integrity: The instructors of this course take Brown's Academic Code, and academic integrity in general, very seriously. Submitting dishonest work, whether on homework or exams, makes it more difficult to effectively help you and your fellow students learn, and it dilutes the meaning of a Brown degree.

It is your responsibility to understand what actions are allowed in this course, and what actions are violations of the Academic Code. Further information is available here. Any incidents that appear to violate course rules will be presented to, and adjudicated by, the university's Academic Code committee.

Inclusivity and Equity: This course strives to be accessible and inclusive to all students, regardless of age, race, nationality, gender identity, sexual orientation, religion, economic background, or any other difference that contributes to the vibrant and diverse Brown community. We are committed to conducting all interactions with students with a sense of respect and equity. We ask that students interact with other students and instructors in this same spirit. If something happens to make you feel unwelcome or discriminated against, please bring it to our attention so that we can try to make the situation right.

In addition, Brown is committed to providing support for students with learning differences, physical impairments, and other disabilities. If you think you may need accommodations due to one of these conditions, contact Student Accessibility Services for more information.

Tentative Schedule:

Week 1 - Jan 27th   Classical Formulas **ONLINE ON ZOOM**

Week 2 - Feb 1st & Feb 3rd   Splitting Fields

Week 3 - Feb 8th & Feb 10th   The Galois Group

Week 4 - Feb 15th & Feb 17th   Roots of Unity

Week 5 - Feb 24th   Solvability by Radicals

Week 6 - Mar 1st & Mar 3rd   Independence of Characters

Week 7 - Mar 8th & Mar 10th   Galois Extensions

Week 8 - Mar 15th & Mar 17th   The Fundamental Theorem of Galois Theory

Week 9 - Mar 22nd & Mar 24th   Applications

Week 10 - Mar 29th & Mar 31st   Spring Recess :)

Week 11 - Apr 5th & Apr 7th   Appendix C: Ruler-Compass Constructions

Week 12 - Apr 12th & Apr 14th   Modules over PIDs

Week 13 - Apr 19th & Apr 21st   Rational Canonical Form

Week 14 - Apr 26th & Apr 28th   Jordan Canonical Form

Final Exam - May 19th at 2:00 PM (EST).