Instructor: Dr. Rebecca R.G., she/her email address: rrebhuhn@gmu.edu

Graduate Learning Assistant: Matthew South, he/him, email address: msouth2@gmu.edu

Office Hours: TBD, or email me or Matthew to meet at another time. Office hours will either be hybrid (both in-person and virtual) or just virtual (using Zoom). See Blackboard for Zoom links.

Textbook: Thomas W. Hungerford, *Algebra*.
Prerequisites: Abstract Algebra (Math 321) or equivalent.

Course Content: Chapter I Sections 1-6, Chapter II Sections 4-5, Chapter III (except localization), Chapter V Section 1.

This includes a deeper dive into (and a more sophisticated take on) group theory than you have likely seen before. We will also learn some ring theory (e.g. principal ideal domains, unique factorization domains, etc.) and field theory (esp. the theory of field *extensions*). Theory, problems, and proofs will all be discussed.

Course Goals: After this course, students should be prepared to take the preliminary exam in algebra. They should be comfortable enough with the basics of groups, rings, and fields to use them to solve problems, and they will be ready to read more advanced algebra texts or take courses in other areas of algebra. In addition, students will have practiced collaborating with other members of the class, and will have gained proficiency in problem solving and in doing mathematics with others.

Covid safety: All students taking courses with a face-to-face component are required to follow the university's public health and safety precautions and procedures outlined on the university Safe Return to Campus webpage (`https://www2.gmu.edu/safe-return-campus`). Similarly, all students in face-to-face and hybrid courses must also complete the Mason COVID Health Check daily, seven days a week. The COVID Health Check system uses a color code system and students will receive either a Green, Yellow, or Red email response. Only students who receive a "green" notification are permitted to attend courses with a face-to-face component. If you suspect that you are sick or have been directed to self-isolate, please quarantine or get testing. Faculty are allowed to ask you to show them that you have received a Green email and are thereby permitted to be in class.

Students are required to follow Mason's current policy about facemask-wearing. As of August 11, 2021, all community members are required to wear a facemask in all indoor settings, including classrooms. An appropriate facemask must cover your nose and mouth at all times in our classroom. If this policy changes, you will be informed; however, students who prefer to wear masks either temporarily or consistently will always be welcome in the classroom.

As a covid precaution, I will allow students to attend class virtually through Zoom (except for the midterm and final, which must be taken in person). If you are at a higher risk from covid, live with someone at a higher risk, are sick (even if it's not covid), or simply feel safer taking class virtually, please do. You can switch back and forth between in person and virtual class as you see what works best for you.

Technology: If you are taking class in person, you will need a device that can access the Course Workbook (a PDF available through Blackboard). I recommend accessing it digitally so that you always have the most up-to-date version. If you would prefer not to share whiteboard markers with others, you will need whiteboard markers in 4 colors.

If you are taking class virtually, you will need a computer, tablet, or other device that can access Zoom, with a speaker so that you can hear what's going on and a microphone so you can talk to others. You may also find it easier to use a device with a touch screen to work collaboratively using Jamboard.

Expectations:

- Come to class (virtually or in person) and work on problems/participate in the discussion as appropriate. Make contributions to both the mathematics and the group dynamic (e.g. make sure everyone in the group gets a chance to speak and don't leave people behind!).

- Do the homework problems. Try to stay on schedule and do them by the deadlines, but if you get behind, talk to me about how to get caught up as soon as possible.

- Ask lots of questions of both me and your peers, make constructive suggestions, and share your ideas.

- You may be asked to present proofs or ideas informally for the class.

Grading: There will be two in-class exams (on **Wednesday, 9/29** and **Wednesday, 11/3**) and a final on **Monday, 12/13 from 4:30-7:15pm**. Together, they will comprise about 60% of your grade. The other approximately 40% of your grade will come from the homework, which will be assigned roughly weekly. The final exam is also the preliminary exam in Algebra, but I may assign grades differently from your prelim grade.

Homework: Homework will be assigned roughly weekly. Homework is graded on a correct/retry basis. If a problem is incorrect, you will receive some feedback on what needs to be changed. Rewrite the problem and turn it in by a week after the homework is returned to you. You may rewrite any problem up to 2 times. To ensure you get credit for your rewrite, I recommend going to office hours (mine or Matthew's) to discuss the problem before you turn in your rewrite. A rewrite must include your original solution, your new solution, and a brief explanation of what you changed and why.

Collaboration: Please work together, both in and out of class! It's hard to survive grad school alone. You can also ask me and Matthew for help on problems. Once you've worked on the problems together, please write your solutions individually, in your own words. Include a list of everyone you spoke to about the problems and any sources you used (or write "worked alone" if you worked

alone). When you are doing rewrites, you may (and should) get help from me and your classmates, but again, you should write up the problem on your own.

Prelim Practice Sessions: Matthew will run weekly sessions during which you will have an opportunity to study for the algebra prelim together. Participation is not required but is strongly recommended, especially if you are in the math PhD program. Schedule TBD, but will be one hour a week for the first 3 weeks of classes and two hours a week thereafter.

Flexibility: If you need flexibility in deadlines, number of rewrites, or anything else, talk to me about it as soon as possible. The earlier you ask, the easier it is to find a way to accommodate you. I will do my best to give you extra help, time, or tries, while not overloading myself, Matthew, or the grader.