Instructor: Dr. Neil Epstein, Planetary Hall 243, Office Phone (703) 993-1473

Office Hours: M 3-4pm, Th 12-1pm, and by appointment


Prerequisites: MATH 290 (or the equivalent) and mathematical maturity.

Course Content: Depending on how things go, we will attempt to cover most of chapters 0-16, with the probable exclusion of chapter 11. This may expand or contract, as appropriate. Important topics include (but are not limited to):

- basic set theory, proof methods and techniques. You should already have a basis for these from your prerequisite class, of course, but we will refine it further here.
- equivalence relations, functions, and properties of the integers
- groups
- subgroups
- cyclic groups
- finite groups
- permutation groups and Cayley’s theorem
- isomorphisms
- cosets and Lagrange’s theorem (a counting principle)
- normal subgroups; simple groups; factor groups
- group homomorphisms
- rings
- integral domains
- ideals; factor rings; ring homomorphisms

Course Structure: This course is designed to maximize your learning. I have elected to avoid a traditional lecture-course structure.
• **Homework and Participation (60%)**: Your homework will consist of three equally important components: (A) advance preparation with reading, writing responses to reading questions, creating some of your own questions; (B) warm-up exercises and in-class work with others and the whole class; (C) completion of main exercises. Homework is assigned in *rolling trios*.

To explain further: Let’s say it’s just before class on Day 7. You already handed in homework 7(A) at the beginning of day 6. Between then and now, you worked on homework 7(B) (along with 6(C) and 8(A)) at home. In class today (after you hand in 6(C) and 8(A)), you will work in groups on perfecting 7(B), which you will hand in at the end of class. By **5pm** at the latest, I will put up the assignment for 7(C) (along with 8(B) and 9(A)) on the course website, and you will work on these in preparation for the next class period, day 8.

I expect everyone to attend and participate actively in class, in particular to speak up during class discussion with questions and ideas, and to work well with others. A substantial part of your work for the course is this active participation in class. Please always be on time and prepared for class, so that we can make the best use of our precious time together. In particular, *much of the class session will be devoted to completing your part (B) homework in groups.*

I expect and encourage you to work collaboratively on homework, but then to write up your own homework paper all by yourself based on what you have learned. Thus your homework papers should not read like anyone else’s. I always expect to receive your homework when due, unless there are extenuating circumstances you discuss with me; speak with me if your homework must be late for a special reason. You should always hand in your homework when due even if it is incomplete. Late homework will receive only partial or no credit. Remember: in this course, your grade is heavily dependent on your homework and class participation.*

Handing in homework (for types A and C) may be done over e-mail or at the beginning of class; however, if you are not skilled at mathematical typesetting, a physically handed-in assignment is probably best. Part (B) should always be an in-class hand in, due to the group-work nature of things.

• **Exams (40%)**: There will be two in-class exams (each worth 10% of the course grade) and a final exam (date to be set by the registrar) worth 20% of the course grade. The exam dates are:
  
  - Exam #1: Wednesday, October 10, in class.
  - Exam #2: Monday, November 12, in class.
  - Final Exam: Wednesday, December 12, 1:30-4:15pm.

**Academic Integrity**: GMU is an Honor Code university; please see the Office for Academic Integrity for a full description of the code and the honor committee process. The principle of academic integrity is taken very seriously and violations are treated gravely. What does academic integrity mean in this course? Essentially this: when you are responsible for a task, you will perform

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*The idea for this schema/teaching model is adapted, with permission, from David Pengelley of New Mexico State University. Some of the text of these paragraphs is also adapted from him.*
that task. When you rely on someone else’s work in an aspect of the performance of that task, you will give full credit in the proper, accepted form. Another aspect of academic integrity is the free play of ideas. Vigorous discussion and debate are encouraged in this course, with the firm expectation that all aspects of the class will be conducted with civility and respect for differing ideas and perspectives. When in doubt (of any kind) please ask for guidance and clarification.†

**Extra Help**: Get to know each other; you will be each other’s resources. Also, do not hesitate to come to my office during office hours or by appointment to discuss a homework problem or any aspect of the course.

**Attendance and Class Participation**: Students are expected to attend classes regularly and participate in all discussions. This will be a participatory course; you are expected to help each other to learn. Please let me know ahead of time if you plan to be absent and why.

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†Text adapted from CTFE website.