MATH 4900 Section 704 - Special Problems (Fall 2026 1)

Special Problems, Math 4900

Class info:

MW 11:10am-12:30pm in GAB 461

Instructor:

Dr. Sean Griffin

Assistant Professor

GAB 409

sean.griffin@unt.edu (mailto:sean.griffin@unt.edu)

Office hours:

-Tentatively Mon 1-2pm + Wed 2-3pm.

-I also have OH for another class Mon 2-3 and Wed 1-2. You're welcome to stop by during those times if there's no one in my office.

-Also by appointment.

Textbook (required):

Abstract Algebra, 3rd edition, by Dummit and Foote

Class summaries:

Day	Sections	Summary	Notes
8/17	Chapter 1	Intro to groups and their basic properties, quick review of main examples such as S_n, GL_n(F), D_{2n}, Z/nZ	Algebra lecture 1.pdf (https://unt.instructure.com/courses/151880/files/40200492?location=course_syllabus_151880&wrap=1) (https://unt.instructure.com/courses/151880/files/40200492/download?location=course_syllabus_151880&download_frd=1)

			(https://unt.instructure.com/courses/151880/files/40247258/download?location=course_syllabus_151880&download_frd=1)
8/24	Chapter 1	Isomorphism, subgroup criteria, centralizers, normalizers	Algebra lecture 3.pdf (https://unt.instructure.com/courses/151880/files/40308609?location=course_syllabus_151880&wrap=1) (https://unt.instructure.com/courses/151880/files/40308609/download?location=course_syllabus_151880&download_frd=1)
8/26	Chapter 1	Cyclic groups, subgroups generated by subsets	

Course description:

A rapid review of undergraduate-level concepts, followed by more advanced topics in group theory and ring theory, ending with some field theory. In the sequel in the Spring we will continue with Galois Theory, modules and advanced linear algebra. Throughout the course we will frame many of the structures/results in modern categorical language. Depending on time and interest, we may touch on basic algebraic geometry, homological algebra and/or representation theory (though these topics are not part of the standard Algebra Qualifying Exam).

Learning objectives:

Group Theory

- Chapter 1: Groups. Rapid review of the most common groups and homomorphisms between them
- Chapter 2: Subgroups.
- Chapter 3: Isomorphism Theorems, Lagrange's Theorem
- Chapter 4: Group actions. Particular emphasis on the class equation and Sylow Theorems.
- Chapter 5: Direct and semidirect products. How to recognize when a subgroup is a direct or semidirect product?
- Chapter 6: Further topics in group theory. Particular emphasis on p-groups, nilpotent groups, and solvable groups.

Ring Theory

- Chapter 7: Polynomial rings. Rings of fractions.

ODA accommodations:

If you have ODA accommodations, please let me know early so that we can figure out the best way to accommodate you. We can discuss further by appointment (see more info below).

Exams:

There will be 1 midterm exam and 1 final exam:

- Midterm, in class on **Wed, October 21**
- Final Exam, in our usual classroom on **Sat, December 5** ***at 10:30am***

Some problems on the Final Exam will be similar in difficulty to Qualifying Exam problems.

You will **not** be allowed to use notes on the exams.

Homework:

Each week, there will be homework due on **Wednesday at start of class**, except on exam weeks.

Some things to keep in mind about homework:

- It probably goes without saying, but homework problems will typically be more difficult than problems you were assigned in an undergrad Modern Algebra course.
- You might need help or hints even if you didn't in undergrad classes. That's normal and absolutely ok! Many of the problems will require a particular insight you may not have seen before. These problems are designed to stretch your mental capacity and creative thought process.
- Do not go searching for help online: ask me or your classmates for help when you got stuck.
- The question of how much detail to include in your proofs is a natural one: we will discuss this in class at some point, though it's a bit hard to nail down exact criteria because it will change depending on the problem.

GenAI policy:

Use of Generative AI (e.g. ChatGPT, Gemini, etc.) or other online aids like Chegg to solve the specific problems assigned as homework is **NOT** allowed.

However, feel free to use it to study for exams. Just be aware that if you do use GenAI, you are responsible for verifying whether its explanations are accurate or not. Generative AI is known to hallucinate and fill in its knowledge gaps with false information, so use it at your own risk for studying. (see more below)

Grades:

- Final Exam: 40%

Letter grades will likely not be converted from the standard 90/80/70 cutoffs but will be curved at the end of the course.

Attendance

You should come to class if you want to be successful in this course. With that said, attendance outside of exams is not required.

Late homework/missing exams

A penalty of 20% (of the overall point total) per day will be deducted for each day your homework assignment is late.

If you need to miss a quiz or an exam because of an **authorized absence (https://policy.unt.edu/policy/06-039)**, please let me know as soon as possible so that we can schedule a makeup.

University-wide policies:

Academic integrity:

Please review the academic integrity policy here:

https://policy.unt.edu/sites/policy.unt.edu/files/06.003%20Student%20Academic%20Integrity.pdf (https://policy.unt.edu/sites/policy.unt.edu/files/06.003%20Student%20Academic%20Integrity.pdf)

ODA (expanded):

The University of North Texas makes reasonable accommodation for students with disabilities. Students needing a reasonable academic accommodation must first register with the Office of Disability Access (ODA) to verify their eligibility. If a disability is verified, the student will request their letter of accommodation. ODA will provide faculty with a reasonable accommodation letter via email to begin a private discussion regarding a student's specific needs in a course. Students may request reasonable accommodations at any time, however, ODA notices of reasonable accommodation should be provided

authority to ask students to discuss such letters during their designated office hours to protect the privacy of the student. For additional information, refer to the Office of Disability Access website.

Unauthorized Aids During Examinations and Assessments

Students may use only those materials and resources that are expressly authorized by the instructor for a particular examination or assessment. Touching, holding, or accessing any unauthorized aid during the examination period constitutes a violation of the Student Code of Conduct, regardless of whether the aid is used.

Any item that may be considered an unauthorized aid must be kept out of view and in a closed container (e.g. zipped backpack, buttoned purse, etc.) during the entirety of the examination or assessment.

Unless specifically authorized in writing by the instructor, prohibited aids include, but are not limited to:

- Mobile phones and smartphones
- Smartwatches and fitness trackers with communication, recording, or internet capabilities
- Tablets, laptops, and other computing devices
- Earbuds, headphones, and other audio devices
- Smart glasses, cameras, recording devices, and wearable technology
- Artificial intelligence (AI) tools, chatbots, and other generative AI technologies
- Notes, textbooks, study guides, formula sheets, or reference materials
- Any other device, material, or resource not expressly permitted by the instructor

Students are responsible for clarifying any questions about permitted materials before the examination begins.

Course Summary:

Date	Details	Due