MATH 305-01: ABSTRACT ALGEBRA II (3 cr.)

SYLLABUS & COURSE POLICIES

DORDT UNIVERSITY

SPRING 2025

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Instructor:	Dr. Mike Janssen, Professor of Mathematics
Email:	`Mike.Janssen@dordt.edu`; I will endeavor to reply to every email within one school day.
Classroom:	CL 92
Class time:	1:50–3:05 PM TTh
Office:	SB 1612
Office Phone:	(712) 722-6398
Student Hours:	By appointment (see Canvas).
Required Resources:	*Abstract Algebra: Theory and Applications* (2022 edition) by Judson
Regular access to Overleaf.com for Written Work
Prerequisite:	Grade of C– or better in Math 152

Catalog course description: A continuation of Mathematics 304. A more extensive study of algebraic structures, focused primarily on groups. If time permits, the Galois correspondence will be explored. This course is offered as an individual studies course unless there is sufficient enrollment to warrant otherwise. Prerequisite: a grade of C– or better in Math 304.

COURSE OVERVIEW

Welcome to Abstract Algebra II! This semester, we'll dive into an exploration of group theory, one of the most beautiful and useful areas of modern mathematics. We will cover roughly chapters 3–6 and 9–15 of Judson. Given time, we'll explore chapter 23 (Galois theory), or perhaps some applications of group theory in physics.

LEARNING OBJECTIVES

In this course, students will:

be *communicators* of mathematics by regularly presenting and writing sound mathematical proofs. (CD)

be *explorers* by engaging with regular exercises inside and outside the classroom, as well as applications of algebra in modern computer science and physics. (CD, CR)

be *learners* of mathematics by demonstrating proficiency with the axiom-definition-theorem-proof mathematical liturgy. (CS)

COURSE LITURGIES

This course will consist primarily of interactive lecture and move through course content at a faster pace than Math 304. Nonetheless, there will be informal daily work, as well as written work due every other week. An exam and final project will round out the work of this course.

DAILY WORK

PROBLEMS AND PRESENTATIONS

We will maintain a running Daily Work document on Overleaf with a list of problems. These problems may be from the textbook, suggested as an exercise in class, or chosen by Dr. Janssen from other sources. This document will be updated regularly with minimal notification, so please make a habit of checking it!

Students will claim a daily work problem as theirs by putting their names *and a solution* in the Overleaf document. Each class period will then begin with an opportunity for students to present newly solved daily work problems. A given student will ordinarily not present more than once per week.

As in previous courses, we will abide by the Policy Statement on Ethical Guidelines[1] adopted by the American Mathematical Society, in particular Section I on mathematical research and its presentation. As this statement describes, "[t]he knowing presentation of another person's mathematical discovery as one's own constitutes plagiarism and is a serious violation of professional ethics. Plagiarism may occur for any type of work, whether written or oral and whether published or not." When you present your work in this class, both orally and in writing, you must cite ANY CONVERSATIONS you have had about your problem with ANYONE IN THE CLASS. Looking to ANY RESOURCE outside of the people in our class—-including generative AI models like ChatGPT!—-for information about the problems at hand constitutes plagiarism and will be reported to the Student Life Committee.

The number of successful daily work presentations will be monitored and factor into the final grade as described below.

WRITTEN WORK

Roughly every week (other than the weeks we have exams), you will be assigned approximately two problems to solve, write up, and submit online by 11:59pm on **Jan. 23, 30; Feb. 6, 13, 20; Mar. 20, 27; Apr. 3, 10, 17, 24**. These will be written in LaTeX, and will generally not be problems that have been presented in class (though they may have been assigned as daily work). Each problem will be graded on a four-level scale as:

Exceeds expectations. Dr. Janssen would be happy to post this as the official class solution.

Meets expectations. The logic is generally correct and it is reasonably well written, but there is room for improvement.

Revision needed. Some major gaps in logic, misuse of notation, or unclear communication requires revision.

Not assessable. This is difficult to read, abuses notation, or contains significant mathematical flaws. Probably best to start over.

A limited number of these problems will be able to be revised as described below. The total number of E's and M's you receive will factor into your final grade.

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[1]See the AMS website for more: `http://www.ams.org/about-us/governance/policy-statements/sec-ethics`.

Your written work *must* include an acknowledgments section or it will be returned ungraded. You may work on this homework with others in the course, but if you discuss ANY mathematical content of any problem with another person, you *must* include their name in the acknowledgments, and ensure that your final writeup is completely your own. EVEN IF YOU DISCUSS A PROBLEM WITH SOMEONE AFTER YOU TURNED THE ASSIGNMENT IN, but before the assignment is due, you should resubmit the assignment and acknowledge the conversation! Looking to ANY RESOURCE outside of the people in our class for information about the problems at hand constitutes plagiarism. Failure to meet these criteria will constitute academic dishonesty and will be reported to the Student Life Committee.

EXAM

There will be one oral exam, held on February 27. The Exam and Project will average together to be a major component of your final grade.

EXPLORATION: PROJECT

You will complete a substantial research project as a part of this course. More details on the precise nature of the work, with rubrics for evaluation, will be available by March 13.

OTHER POLICIES AND ADVICE

I am generally fairly accepting of late work, with a built-in 24-hour grace period for any non-classroom activities. Additional time beyond the 24-hour grace period must be approved ahead of time.

Student hours are your time to ask questions about all aspects of the class and college life. Please check online for an appointment. If you can't find one, send me an email! I will do my very best to accommodate your you.

Email Policy: I check my email twice per school day: once in the morning, where I'll deal with any emergencies, and once in the afternoon, when I'll respond to other emails (including any that have come in since the morning). If you require a more immediate response, you're welcome to come find me in my office.

Policy on Generative AI: Unless specifically permitted by Dr. Janssen in advance of student submission of work, any use of AI will be considered a breach of academic integrity. Suspected cases of misuse of AI tools will be treated as plagiarism and submitted to the Student Life Committee.

GRADING POLICY

In general, the **highest fully completed row** in Table 1 will determine your final grade.

Grade	DW Presentations	WW Pass	WW E	Exam and Project
A	10	20/22	14	87%
A–	10	19/22	13	84%
B+	9	18/22	11	80%
B	9	17/22	10	77%
B–	9	16/22	9	74%
C+	8	15/22	9	70%
C	8	14/22	7	67%
C–	7	12/22	6	64%
D	5	10/22	0	55%

Table 1: The Final Grade table.

TENTATIVE SCHEDULE

- Chapter 3: January 14–16
- Chapter 4: January 21–23
- Chapter 5: January 28–February 4
- Chapter 6: February 6–10
- Chapter 9: February 13–18
- Chapter 10: February 20–25

- Chapter 11: March 13–18
- Chapter 12: March 20–27
- Chapter 13: April 1–3
- Chapter 14: April 8–15
- Chapter 15: April 17–24
- Group theory in physics: April 29

INSTITUTIONAL POLICIES

DORDT UNIVERSITY STUDENT'S RIGHT TO ACCOMODATIONS POLICY

Dordt University is committed to providing reasonable accommodations for students with documented qualifying disabilities in accordance with federal laws and university policy. Any student who needs access to accommodations based on the impact of a documented disability should contact the Coordinator for Service for Students with Disabilities, Academic Enrichment Center, 712-722-6490, Email: CSSD@dordt.edu.

DORDT UNIVERSITY ACADEMIC INTEGRITY POLICY

Dordt University is committed to developing a community of Christian scholars where all members accept the responsibility of practicing personal and academic integrity in obedience to biblical teaching. For students, this means not lying, cheating, or stealing others' work to gain academic advantage; it also means opposing academic dishonesty.

Students found to be academically dishonest will receive academic sanctions from their professor (from a failing grade on the particular academic task to a failing grade in the course) and will be reported to the Student Life Committee for possible institutional sanctions (from a warning to dismissal from the university). Appeals in such matters will be handled by the student disciplinary process. For more information, see the Student Handbook section concerning Academic Integrity.

DORDT UNIVERSITY ATTENDANCE POLICY

Class attendance policies and procedures as outlined in the Student Handbook are in place. To paraphrase the Student Handbook, Dordt University as an institution remains committed to in person instruction for face-to-face courses. As a result, you are expected to be present for every class period and laboratory period. Should you need to miss class for any reason, contact your instructor as soon as possible (either prior to the absence or immediately following). If the absence is the result of a documented disability, academic accommodations will be handled by the Coordinator for Service for Students with Disabilities. Absences for Dordt-sponsored curricular or co-curricular activities will be communicated by the activity sponsor and are considered excused. You are responsible to contact your instructor to make arrangements for missed work. Your instructor is not required to provide real time (synchronous) learning for you should you be absent for class for any reason (e.g., Zooming into your real time class). Your instructor is also not required to provide asynchronous virtual learning materials for you (e.g., recordings of missed classes, slide decks, other materials on Canvas). While some instructors might utilize some of the synchronous/asynchronous methods of making up work on occasion, you should not expect all instructors to provide these experiences automatically. Methods of making up missed work might include: contacting a fellow student to get notes from class, extensions on assignments or labs, or other methods as determined by your instructor. Making arrangements for missed class work is your responsibility! Please see your instructor's specific attendance policy.

> **I reserve the right to make changes to this document as the need arises.**