Mayville State University

Math 443 Algebraic Structures with Programming Syllabus

(**Online 27555**) Fall 2025
3 Credit Hours

Course and Instructor Information

Instructor Name: Mary Townsend

Contact Information:

Office: Classroom Building 108A Email: mary.townsend@mayvillestate.edu

Work phone: 701-788-4672

Hours of Availability:

Monday, Wednesday: noon to 12:50 p.m. on campus

Also available for meetings on other days (including weekends) and times by appointment.

Office Hours Meeting Link: https://mayvillestate.zoom.us/j/89626410446

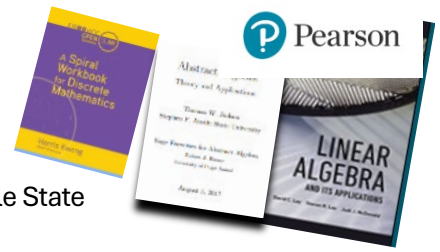
Instructional Mode: Online asynchronous **Course Dates:** August 25 – December 19. 2025

Time Zone: All times indicated throughout this syllabus reflect Central Time (CT).

Meeting Times and/or Location: By appointment by zoom

Final Exam Time and Location: To be arranged by student with instructor and proctor

Zoom or Teams Link: https://mayvillestate.zoom.us/j/86949391714



Course Materials and Technologies

Required Online Software: We will use Pearson's MyMathLab as our primary homework system. This requires a paid access code (you may purchase at the Mayville State bookstore or online).

Recommended Textbook: *Linear Algebra and Its Applications Sixth Edition by Lay, Lay, and McDonald ISBN-10. 1292351217 · ISBN-13. 978-1292351216 (NOTE: The paper copy of the book is not required since the online book is included with the access code to the Pearson's MyMathLab).*

Required Open Educational Resource (OER) Textbooks: *Abstract Algebra Theory and Applications (2017) by Thomas W. Judson and A Spiral Workbook for Discrete Mathematics (2015) by Harris Kwong is an OER published by Open Suny. Note: PDFs to these textbooks are free and available in the Syllabus, Schedule, OER Textbooks, and MyMathLab Registration Instructions folder in the Blackboard course shell for this course.*

Required Technology: Students will need a laptop and a graphing or scientific calculator.

Technologies available for the comprehensive exam are a graphing and/or scientific calculator. Notes for the exam must be printed (not online). Technologies available to students as they study and prepare for the exam include a graphing and/or scientific calculator, online software including:

- https://www.khanacademy.org/
- https://www.mathsisfun.com/
- https://www.wolframalpha.com/
- https://www.desmos.com/calculator
- https://www.geogebra.org/graphing?lang=en
- https://www.numworks.com/simulator/

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Required

MSU Technology Requirements

Use of Artificial Intelligence in this Course

AI tools may be used in this course if their purpose is to support your learning. The goal is always your own understanding, not just getting an answer. If you choose to use AI, treat its output as a starting point or building block—not a final product. Always aim to understand, question, and build upon what AI provides so that your own mathematical thinking and teaching skills continue to grow.

Course Description

This course covers topics in both linear and abstract algebra. Linear algebra topics of matrix operations, determinants, systems of linear equations, linear transformations, eigenvectors, and vector spaces are covered. Linear programming, solving matrices, and determinants with computer software, and graphing calculators are used to illustrate applications. Abstract Algebra topics including modular arithmetic, groups, isomorphisms, fields, rings, and integral domains are learned through the study of real numbers, integers, rational numbers, polynomials, and complex numbers.

Pre-/Co-requisites: Math 165: Calculus I

Course Objectives

To successfully complete this course, the learner will be expected to meet the following objectives, as aligned to Mathematics Education Program Approval Standards through North Dakota's Education Standards and Practices Board (ND ESPB):

Course Objectives for Linear Algebra Topics:

- Solve determinants using/not using a graphing calculator or online calculator.
- Add, subtract, multiply and find inverses of matrices and translate into systems of equations.
- Solve systems of equations yielding parametric solutions to multi-variable linear systems
- Solve application problems, using linear systems of equations and vectors, in the areas of engineering, physics, biology, and computer science.
- Solve and present a real-life problem in a Problem Based Learning (PBL) Project.

Course Objectives for Abstract Algebra Topics:

- Utilize the terminology and symbols of Abstract Algebra to elucidate which number system sets and subsets fit into the algebraic structures of groups, isomorphisms, integral domains, rings, and fields after defining those structures.
- Use the symbols and their understanding of the number system sets of reals, integers, rational numbers, polynomials, and complex numbers to solve problems.
- Construct and analyze Cayley Tables of the subsets of number systems listed above.
- Apply linear programming/graphing to solve problems.

Standards Alignment (Mathematics Education Program Approval Standards-ND ESPB):

- 11010.1 Mathematical Practices and Processes: The program requires the candidate to demonstrate the following: a. makes sense of problems and perseveres in solving them, b. reasons abstractly and quantitatively, c. constructs viable arguments and proofs, d. critiques the reasoning of others, e. uses mathematical models, f. attends to precision, g. identifies elements of structure, h. engages in mathematical communication

- 11010.3 Secondary School Content Knowledge: The program requires the teacher candidate to demonstrate and applies knowledge of secondary mathematics concepts, algorithms, procedures, applications in varied contexts, and connections within and among mathematical domains (Complex Number System, Algebra, Geometry, Trigonometry, Statistics, Probability, Calculus, and Discrete Mathematics)
- 11010.4 Undergraduate Mathematics Content Knowledge: The program requires the teacher candidate to demonstrate and apply knowledge of the core mathematics content including calculus, axiomatic geometry, linear and abstract algebra, statistics, probability, and computer programming

Course Expectations

Becoming proficient in mathematics requires hard work and practice. Students are expected to take notes as they watch the PowerPoint presentations, to ask questions, to do practice problems, to solve graded homework problems, to thoughtfully write answers to journal questions, to discuss their journal answers in class and to submit professional answers to journal questions in Blackboard. Students are expected to communicate using proper mathematical notation and grammar in a legible manner as they show the steps used to determine solutions. Students will demonstrate mastery of concepts on scheduled exams.

Students are expected to display academic honesty and respect for themselves, their classmates, their instructor and the Mathematics department. For each unit, students should provide at least one discussion board entry and respond to at least two discussion board questions provided by peers. Students will be required to journal about their learning plans and key concepts of the unit before each exam.

Students are responsible to:

- Read text, watch PowerPoint presentations and/or videos, and complete graded homework problems. Each unit has its own folder in Blackboard and MyMathLab as well as folders to review for the three unit exams , the take home final exam and the proctored final exam.
- Complete graded assignments including quizzes, journals, and homework by designated due dates.
- Ask questions and participate in online discussions via Discussion Boards.
- Prepare for exams by practicing problems and completing assigned work.
- Analyze results of practice problems, assigned work, and exams to learn from mistakes and gain mastery of content.

Instructor/Student Communication

Students are accountable for all academic communications sent to their Mayville State University email address. Students are encouraged to communicate by e-mail when they submit work early and/or request an extension on a deadline.

Students may e-mail questions regarding specific problems or a request for help by zoom or in person. E-mails will typically be answered within 24 hours. If no answer was given, please forward the original e-mail with a reminder after 24 hours.

Journals, quizzes, and discussion board posts will typically be graded within 48 hours. Exams will be graded within one week of submission. Students are encouraged to double-check the Blackboard gradebook to ensure scores are entered correctly.

Professor Townsend will submit Kudos (messages of praise and honor) in Starfish (Mayville State's early alert system) when students perform well on exams, quizzes, journals, and homework AND when students are showing improvement. When students perform poorly or miss deadlines, a Starfish flag will be raised by

Professor Townsend. When students get a message in Starfish, a copy is also sent to the student's advisor, coach, the student success center coordinator, and other instructors that semester.

Graded Assignments and Assessments

The assignments and assessments in this course include graded homework in MyMathLab as well as quizzes, journals, discussion boards in Blackboard and proctored exams. See a breakdown of the weighted grade these activities have in the next section.

Evaluation and Grading

The students will be graded one of two ways: Option A: Weighted grades on four components: exams (60%), online quizzes in Blackboard (10%), online graded homework in Blackboard (25%), and journal postings/discussion boards (5%) OR Option B: Exam averages (the 4 unit exams will each be worth 100 points and the final exam will be worth 200 points).

Grading Policies

Students highest option will be the grade for the course. Suppose the student has an exam average of 88% and a weighted grade of 94%. The student would earn 94%, an A in the course. If the student had a weighted grade of 74% and exam percentage of 81%, the student would earn a B with 81%.

Attendance/Participation Policies

Please communicate by e-mail to Professor Townsend at mary.townsend@mayvillestate.edu if you will be absent or unable to complete work due to an illness or other reason. If you know in advance that you will be absent such as for a scheduled surgery or athletic event, please make arrangements to complete the exam or homework prior to the due date. In the event of an emergency (such as a death in the family, an accident, or illness), accommodations can be made to extend a deadline.

Grading Scale

90^{+} A 80 – 89.9 B 70 – 79.9 C 60 – 69.9 D < 60 F

Breakdown of Grades

- **Exams (60% or 100%):** Students will be graded on 3 unit exams each worth 100 points and a take home final exam worth 100 points and a proctored final exam worth 100 points. In the event that a student has a higher exam average than weighted course grade, the exam average will become the computed grade percentage. **Note:** If students earn 90% or higher on exams, they will be awarded an A in the course, if their exam percentage is between 80 and 89.99%, they will earn no lower than a B in the course. The other activities are provided to help students master the material; if students elect to take the exams, they can still meet the requirements of this course.
- **Quizzes (10%):** Students have the opportunity to answer questions on each online quiz as often as they want prior to the exam on that unit. The highest grade on each quiz will be used. Students may earn a maximum of 105% in this category. Some quizzes are extra credit or have extra credit points available.
- **Graded Homework (25%):** Students will have the opportunity to do practice problems before completing graded homework in myOpenMath. Students may work together as they do homework, but they must each do the problems in myOpenMath to earn credit. There will be opportunities to ask questions in discussion boards and to post additional resources in discussion boards. The review for each unit exam in myOpenMath allows students to earn additional graded homework points; however, students may earn a maximum of 105% in this homework category.

- **Journals/Discussion Boards (5%):** Students will introduce themselves to the class in a discussion board, they will express using complete sentences their mathematical background in a journal at the beginning of the course, and show how to solve various types of problems in each unit. Students will explain how they plan to prepare for exams and reflect on their performance on exams. Students will be expected to set and achieve short-term goals throughout the course. Students will communicate to one another via discussion boards asking and answering questions related to course objectives. Students may earn a maximum of 105% in this category.

Enrollment Verification

The enrollment verification activity for Math 443 is to complete the syllabus quiz, 6 Critical Questions Journal, and Introduction Discussion Board in Blackboard. These three activities are due on Friday, 8/29 by noon.

Online Course Statement

The U.S. Department of Education requires instructors of online courses to provide an activity which will validate student enrollment in this course. The only way to verify that a student has been in this course is if he, she, or they perform an action in the LMS, such as completing an assignment or taking a quiz. Logging into the LMS is **NOT** considered active course participation. Please complete the designated enrollment verification activity by the date indicated. If it is not complete your enrollment in this course will be at risk.

Proctor Notification

A proctor is required for each of the unit exams. Students may submit a proctor request form to take exams with a proctor in their community or schedule to take the exam with Professor Townsend proctoring in person or by zoom. Proctors must have a valid work e-mail (not a gmail, yahoo, or msn.com type of e-mail). Proctors cannot be a friend or family member; however, a coworker or work supervisor may serve as your proctor.

Each exam will be a paper/pencil exam. Students may have two pages of notes and a graphing or scientific calculator for each unit exam. Students may have eight pages of notes on the comprehensive proctored final exam.

Important Student Information

In the Help & Resources for Students section of the Blackboard Institution Page, you can view and download the Important Student Information document for the current academic year. It includes information about:

- ✓ Land Acknowledgement Statement
- ✓ Academic Grievance Concerns and Instructor English Proficiency
- ✓ NetTutor - Online Tutoring Program
- ✓ Starfish - Student Success System
- ✓ Students with Documented Disabilities
- ✓ Student Learning Outcomes / Essential Learning Outcomes
- ✓ Academic Honesty
- ✓ Emergency Notification
- ✓ Continuity of Academic Instruction for a Pandemic or Emergency
- ✓ Family Educational Rights and Privacy Act of 1974 (FERPA)
- ✓ Diversity Statement (Title IX)

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Course Timeline/Schedule

The important dates to remember:

1. **Enrollment verification activities** (6 Critical Questions journal, introduction discussion board, and syllabus quiz) are due on Friday of week 1 on 8/29 before noon.
2. **Quizzes, journals, and discussion board posts** are typically due on Mondays before midnight. These are listed in the Math 443 Tentative Fall 2025 Schedule document found in the syllabus, schedule and myOpenMath folder in Blackboard.
3. **There will be three unit exams**. Exam 1 is due by Monday, 9/29; exam 2 is due by Monday, 10/27; the take home exam 3 is due by Wednesday, 12/3. Students need to submit the journal before the exam at least 48 hours before taking each exam.
4. **The take home final exam** is due by Friday, 12/12, and the **proctored final exam** is due Wednesday, 12/17. Students must take both the take home final exam and the proctored final exam.

The Course Timeline and Schedule are subject to change as deemed necessary by the instructor.

A more detailed schedule is found in the Blackboard course shell in the *Syllabus, Schedule, OER Textbooks, and MyMathLab Registration Instructions* folder near the top of the Content section.