MA401   **Abstract Algebra I**

Instructor:	**Class Meetings Location/Time:**	**Office Location:**
Lee Redmond	TR CRB 105 1:00 - 2:15	136

Phone:	**E-mail Address:**
254-3399	**lredmond@mvsu.edu**

CRB Office Hours:	**Virtual Office Hours:**
MWF**:** 10:00 - 11:00 am ; 1:00 -2:00 pm	MWF: 10:00 - 11:00 am
TR: 2:30 pm - 4:00 pm	
M: 2:00 pm - 3:00 pm	

COURSE DESCRIPTION

Binary Operations, groups, subgroups, permutations, cyclic groups, finitely generated and abelian groups, rings, integral domains.

PREREQUISITES

MA 300 and preferable a course in linear algebra.

COURSE OVERVIEW

This course is designed to meet the needs of students majoring in mathematics who are in pursuit of a B.S. degree, those who plan to attend graduate school and those who plan to become teachers of mathematics. Because many students will not have much experience with abstract thinking, a number of familiar concrete examples involving logic, set and number theory, induction and binary operations are introduced at the beginning of the course. Most of the semester will be used to provide students with detailed presentation of one of the simplest structures of abstract algebra called groups. Students are expected to learn to read and understand formal proofs on groups and then be able to construct proofs on their own. This course requires students to think reflectively about the well-known methods used in previous courses to solve problems of different types in a concrete setting and use this information to successfully make the transition to writing proofs and producing concrete examples involving more abstract objects and concepts. Such transformation of knowledge indicated mathematical maturity that is exemplary of a potential holistic transformer. It typifies scholarship and reflective thinking and equips students for a lifetime enjoyment and appreciation for higher mathematics. If time permits, the course will conclude with a discussion of the more complex structures rings and fields.

COURSE CONTENT

Text

Saracino, Dan. 2nd ed. **Abstract Algebra: A First Course**. Brooks/Cole, Cengage Learning.

COURSE OUTCOMES/GOALS
1. Provide students with adequate knowledge of the preliminaries that they can build on to develop their ability to prove results in algebra**.**
2. Present the subject of Abstract Algebra in a clear manner so that students of different levels of achievements will understand and learn to appreciate and apply the major concepts to real- life situations.
3. Prepare students to communicate mathematical ideas using everyday and mathematical language orally and in writing.
4. Provide student with an instrument for investigating everyday phenomena of the real world.
5. Teach students to investigate and understand the content of the course through solving problems.

Major areas of study

I. Preliminaries : **Week 1 & Week 2 *(August 23, 2022- September 22, 2022)***
Mathematical logic, truth tables, conditional statements, fundamental results in number theory, and methods of proofs.

II. Sets and Induction: **Week 3 *(September 5 - 9, 2022)***
III. Binary Operations: **Week 4 *(September 12 - 16, 2022)***
Mappings, Sets, operations, functions, matrices, n-tuples, binary operations, cayley tables, integer modulo, ordered paris

III. Groups: **Week 5 & Week 6 *(September 19 - September 30, 2022)***
Definition, basic properties and examples.

IV. Fundamental Theorem about Groups: **Week 7 & 8 *(October 3 - 14, 2022)***

V. Powers of an Element; Cyclic Groups. **Week 9** (***October 17 - 21, 2022)***

VI. Introduction to Subgroups **Week 10 *(October 24 - 28, 2022)***
Definitions, properties of subgroup, Klein-4 group, proper and improper subgroups.
VII. Theorem on Subgroups: **Week 11 & Week 12 *(Oct. 31 - Nov. 11, 2022***)
lemmas, corollaries, and theorems
VII. Direct Products: **Week 13 *(Nov. 14 - 18, 2022)***
VIII. Introduction to Rings **Week 14 *(Nov. 28, 2022 - Dec 2, 2022)***
Definitions and examples.

***Dates and topics are subject to change.

COURSE OBJECTIVES

Upon completion of MA 401, students should be able to:
1. Use familiar concepts of the preliminaries including such topics as sets, number theory, and number systems that they can build on to help prove results In algebra.
2. Construct Proofs using different methods.
3. Utilize concepts of calculus and linear algebra to describe, model, and solve problems.
4. Relate operations, sets, lemmas, axioms, corollaries, theorems, and proofs to higher mathematics.
5. Communicate abstracts ideas orally and in writing using symbols.

MAJOR STUDENT ACTIVITIES

(1)   Students are expected to have a comprehensive understanding of the content areas of study as a result of the materials being covered. Therefore, you are expected to read intensively from the textbook and spend a considerable amount of time solving problems to help understand the concepts. **Every student must have the textbook and must bring it to class daily**.
(2)   Students are expected to pass examinations based on classroom lectures, and homework assignments. For any student who could not take the test, a **make-up test must** be taken at the time designated by the instructor.   Notification must come on or before the day of the test.   Failure to makeup a test results in a grade of **zero**.
(3)   Random quizzes will be given. **Quizzes cannot be made up.**
(4)   Students are strongly encouraged to participate in all class activities and assignments with both the instructor and other students.   Students may earn extra points toward their daily average through class participation (solving , presenting, and discussing problems in class).
(5)   All homework assignments must be completed and submitted on time. **Incomplete or late** work will not be accepted unless prior preparations have been made with the instructor. Assignments are to be submitted at the beginning of class before the instructor arrives.
(6)   A notebook(Binder or Folder) should be maintained which contains lecture notes and all homework and practice exercises properly labeled. There may be random notebook checks.

EVALUATION AND GRADING PROCEDURES

The followings will be used to determine the final grade.

Content Examinations and Special Assignments............................60%
Final Exam 15%
Quizzes, Lab and Homework .... .35%

Grading Scales:

SCORE	GRADE
90-100	A
80-89	B
70-79	C
60-69	D
BELOW 60	F

ATTENDANCE POLICY

It is necessary for students to attend every class meeting or each zoom session. Any student who misses more than the allowed number of absences will be subject to a decrease in their final grade. It is the student's responsibility to check with the instructor and other students before the next class meeting to find out what happened on days when he/she was out of class. Being excused **does not** mean you are not responsible for any assignments submitted that day. Those assignments must be submitted before the next class meeting unless other arrangements have been made with the instructor.

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TECHNOLOGY

Students often use the assistance of technology for the numerical and other presentations encountered in this course which allows students to spend less time with time - consuming calculations and diagrams and more time with analyzing, reasoning, and proving results. However, developing these skills effectively requires students to gather materials through the use of various resources in the library and the computer laboratory.

ADA/STUDENTS WITH SPECIAL NEEDS

Mississippi Valley State University is committed to providing reasonable accommodations for students with a documented disability. If you feel you are eligible to receive accommodations for a covered disability (medical, physical, psychiatric, learning, vision, hearing, etc.) and would like to request it for this course, you must be registered with the Services for Students with Disabilities (SSD) program administered by University College. It is recommended that you visit the Disabilities Office located in the Social Science Building Office 105 to register for the program at the beginning of each semester. For more information or to schedule an appointment, please contact Mrs. Kathy Brownlow, via phone or email at 662-254-3443 or kbrownlow@mvsu.edu.

INCOMPLETE

Only students with acceptable excuses who could not complete the course requirements within the semester will be considered for a grade of incomplete. The student must have a passing grade (**C or better**) up to the withdrawal date. Otherwise, students should drop or withdraw from the class.

Note: Cell phones should not be used at any time during the class period. It is preferred that cell phones not be visible.

Cheating, Plagiarism/Academic Integrity and Penalties:
Cheating is a serious offense and will not be tolerated. You are expected to complete your own work for homework assignments although you are encouraged to seek assistance from your classmates. Do not use Mathway, Photomath or any other application for assignments that will be graded. Any student found cheating on homework or any other class activity will be subject to disciplinary action. Penalties for academic dishonesty might include the assignment of an "F" for the course grade and/or other administrative penalties consistent with the policies of the university.

This document does not constitute a contract with the university. It contains guidelines and I reserve the right to make changes on this syllabus as needed.