

**WEBSTER UNIVERSITY**  
**Course Syllabus**

**MTHC 5360.01**  
**COURSE NUMBER AND SECTION**

**Andrea Rothbart**  
**INSTRUCTOR**

**Algebraic Structures**  
**COURSE TITLE**

**TERM: F I YEAR: 2000**  
**F II**  
**SP I**  
**SP II**  
**SU XX**

**50**  
**SITE**

**1. Course Description: (Student focus, rationale, scope, prerequisites)**

In this course, which is designed for secondary school math teachers, a variety of mathematical structures are investigated. In each class we will be exploring the algebra of the structure(s) under consideration; we will be simplifying algebraic expressions and solving assorted algebraic equations. Relevant theory will be developed.

**2. Learning Outcomes: (Goals, objectives, course outcomes, etc.)**

The high school teacher will obtain a more sophisticated understanding of ordinary algebra and its relationship to the rest of mathematics. Participants will also further develop their ability to express mathematical arguments.

**3. Schedule of required readings, class preparations and assignments, lectures, discussions, student presentations, and exams:**

**Class**

- 1: Permutations; applications**
- 2:  $2 \times 2$  Singular Matrices under multiplication; applications**
- 3: The units of the modular systems under mod multiplication**
- 4: Some central ideas about groups; additional examples of groups; developing group tables; applications to the period of decimal representations of rational numbers.**
- 5. Polynomials over assorted integral domains; roots of polynomials; key ideas and results**
- 6. Quiz; Modular Systems under + and  $\times$**
- 7. Matrices under + and  $\times$**
- 8. Some central ideas about rings and integral domains; additional examples of integral domains.**
- 9. Fields; Complex Numbers and subfields of the complex numbers including the reals and the rationals;**
- 10. Modular field extensions.**
- 11. Some central ideas about fields; additional example of fields.**
- 12. Quiz**

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4. **RESOURCES:**

**Text Used:** Materials will be distributed by the instructor

**Supplemental Readings:** (List and indicate how these are to be used.)  
Material will be distributed by instructor

**Audio Visual/Other :**

5. **EVALUATION:**

- a) Term Paper
- b) Examinations X
- c) Class participation X
- d) Class presentation
- e) Other

**This syllabus is subject to change at the discretion of the instructor.  
Therefore, regular attendance is required.**