

## Math 302 – Applied Modern Algebra Spring 2017

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**Course Meetings:** Tuesday & Thursday 1:00 – 2:15pm, 110 Hume Hall

**Instructor:** Dr. Laura Sheppardson

**Office:** 320 Hume Hall

**Phone:** (662) 915-1463

**Office Hours:** Mon-Tues-Wed 2:30 – 3:30, or by appointment

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### Texts

*Mathematics, A Discrete Introduction*, by Edward R. Scheinerman, any edition

Also recommended: *Discrete and Combinatorial Mathematics*, by Ralph Grimaldi

### Topics

By the end of this course, you should be able to

- define the four basic properties of an abstract group, determine whether a set and operation satisfy these properties, and use them to prove other facts about groups
- perform calculations using modular arithmetic, including finding multiplicative inverses and solving simultaneous linear equations
- explain the theoretical basis for public key encryption, and apply (simplified versions of) both Rabin's method and RSA algorithms
- apply Polya enumeration methods to examples involving symmetry groups
- perform addition and subtraction of sequences and abstract power series
- write recurrence relations to model counting problems, and solve linear recurrence relations
- use basic ordinary and exponential generating functions to solve counting problems

Coverage of these topics will include sections 22, 26, 27, and 34-45 of the 2<sup>nd</sup> edition Scheinerman text. Extensive material supplemental to the required textbook will be provided.

### Blackboard

You will use the Blackboard online course system to get course assignments and supplemental materials, take quizzes, monitor your grades, and communicate with classmates. Login at [blackboard.olemiss.edu](http://blackboard.olemiss.edu).

You can find basic instructions for using the system at [www.olemiss.edu/blackboard](http://www.olemiss.edu/blackboard)

### Homework and Quizzes

You are expected to work all assigned problems, although not all will be graded. Practice problems will be given for each lecture. You should work as many of the recommended problems as you can before the next class period. This way you can ask useful questions before moving on to new material.

You will be notified in advance of homework problems selected for grading. These will be graded on both content and presentation. No late homework will be accepted. You are encouraged to form study groups and to discuss homework problems with your classmates. However, the work you turn in must be your own. That is, everything you write must be in your own words, and you need to understand everything you have written.

Quizzes may be given both in class and on Blackboard. No collaboration is allowed.

### Tests

There will be four (4) in-class tests. All will be closed-book. You may use a simple 4-function calculator if you so choose. No other electronic devices will be needed or allowed. Make-up tests will not be given except when a student is absent for an official University function, for which written documentation has been provided. If you must miss a test, you should notify me before the scheduled test time. The final exam will be cumulative, and will also be closed book with only basic calculators.

### Grade Calculation

Your overall grade will be based on the higher of two point totals:

Homework and quizzes 100 points  
Best two (2) tests, 100 each 200 points  
Final exam 200 points

#### OR

Homework and quizzes 100 points  
Three tests, 100 each 300 points  
Final exam *percentage* 100 points

Score	%	Minimum grade*
465	93%	A
450	90%	A-
435	87%	B+
415	83%	B
400	80%	B-
385	77%	C+
350	70%	C
300	60%	D

*Remember that grades lower than C in mathematics courses will not be counted toward the mathematics major for the B.A. or B. S. degree.*

### Tentative Schedule

*These are subject to change. You will be notified of any changes at least one week before the actual test.*

Thursday, February 23\* Test 1 Modular Arithmetic, Groups, Encryption  
Thursday, March 30 Test 2 Symmetry, Polya Enumeration  
Thursday, April 27 Test 3 Generating Functions, Recurrence Relations  
Thursday, May 11, noon Final Exam

### Regrading

If you believe a problem has been graded in error, you must submit a regrade request in writing, along with your paper, no more than one week after that test or assignment is returned in class (or after a grade is recorded for an online assignment). Do not change or add to the work on your paper. Make any necessary notes on a separate sheet.

### Attendance

Attendance will be recorded for informational purposes. You are responsible for any material, assignments, or announcements that you miss if absent from a class. No special accommodations (e.g. copies of lecture notes, make-up tests, etc.) will be provided. (You *are* encouraged to come to office hours if you have questions on what you missed.) The only exception to this policy is for participation in a University function, documented in advance of the event. *Excessive absences may result in the student being dropped from or failing the course.*

Cell phones, pagers, and other electronic devices which might cause disruption should be turned off or silenced before class begins.

### Academic Misconduct

You are expected to abide by the guidelines for academic honesty given in the M-Book. Sanctions for academic misconduct may include grade reduction, extra work, failure of the course, suspension, expulsion, or a combination of these sanctions. Academic misconduct includes presenting for grading anything which is not your own original work, using unapproved sources for any assignment or test, allowing someone else to copy your work for a graded assignment, or asking for a regrade of a paper that has been altered from its original form. If you study with other students or a tutor, do not look at notes from that study when you write homework to be graded. *If you have any doubts about whether something is proper, ask.*

### Special Needs

It is University policy to provide, on a flexible and individual basis, reasonable classroom accommodations to students who have verified disabilities that may affect their ability to participate in course activities or meet course requirements. Students with disabilities are encouraged to contact the instructor to discuss their individual needs for accommodations.