COURSE DESCRIPTION

Dept., Number	Math 302	Course Title	Applied Modern Algebra
Semester hours	3	Course Coordinator	Laura Sheppardson, Assistant Professor

Current Catalog Description

Languages, generating functions, recurrence relations, optimization, rings, groups, coding theory, and Polya theory.

Textbook

Required: Edward R. Scheinerman, *Mathematics, A Discrete Introduction,* 2nd edition, Brooks and Cole, 2006.

Recommended: Ralph P. Grimaldi. *Discrete and Combinatorial Mathematics: An Applied Introduction,* 5th edition, Addison Wesley, 2004.

References

The course website is on the Blackboard system.

Course Outcomes

Upon successful completion of this course, students can:

1. 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,
2. perform calculations using modular arithmetic, including finding multiplicative inverses and solving simultaneous linear equations,
3. understand the theoretical basis for public key encryption, and apply (simplified versions of) both Rabin's method and RSA algorithms,
4. apply Polya enumeration methods to examples involving symmetry groups,
5. perform addition and subtraction of sequences and abstract power series,
6. write recurrence relations to model counting problems, and solve linear recurrence relations,
7. use basic ordinary and exponential generating functions to solve counting problems.

Relationship between Course Outcomes and Program Outcomes

The ABET/CAC criteria for computer science require the study of discrete mathematics. The BSCS program requires Math 301 and 302 to satisfy this expectation.

All seven course outcomes contribute to program outcomes (a) and (j).

Prerequisites by Topic

This is a continuation of Math 301, Discrete Mathematics.

Major Topics Covered in the Course

The study of the topics identified in the course outcomes uses chapters 22, 26, 27, and 34-45 of the Scheinerman textbook.

Assessment Plan for the Course

The instructor assesses the student performance related to the course outcomes by using examinations, quizzes, and homework assignments.

How Data in the Course are Used to Assess Program Outcomes (unless adequately covered already in the assessment discussion under Criterion 4)

The conduct of this course is not governed by the ABET program faculty. No data are collected that are used to assess program outcomes directly.

Estimate Curriculum Category Content (Semester hours)

Area	Core	Advanced	Area	Core	Advanced
Algorithms			Software design		
Data structures			Concepts of programming languages		
Discrete math	3				