

MATH 523
GEOMETRIC AND ALGEBRAIC STRUCTURES
Nicholls State University, Spring 2007

Instructor: Dr. Brian Heck
Office: 106-E Peltier
Phone: 448-4383
Email: brian.heck@nicholls.edu

My office hours are 9-12, 1:30-3 T, Th and 1:30-3 M, W. Please contact me (phone, email, or in person) during these times if you have any questions. If you need assistance at a different time, let me know and we'll work something out.

Prerequisite/Corequisite: Math 509

Text: Algebra: Abstract and Concrete (2nd ed.) by Frederick Goodman (Prentice Hall)

Course Description (catalog): Examination of the complementary relationships between geometry and algebra, and among the structures in each discipline. Focuses on the interdependence among geometric and algebraic properties of objects. Spatial reasoning, non-Euclidean representations of curves and space, fractal geometry, calculus of higher dimensions. Representation of geometric structures and other phenomena via semigroups, groups, rings, and other algebraic constructs.

Course Description (instructor): This course could be easily a geometrical approach to algebra or an algebraic approach to geometry. We'll do the former. I will not assume students know any modern algebra. Our text is designed for undergraduates, so we will cover it rather briskly. We will cover most of the first 2 chapters and then parts of Chapters 5 and 6. In particular, at the end of the semester, a student will be able to:

- define many types of groups, including (but not limited to) finite group, infinite group, cyclic group, dihedral group, symmetry group, permutation group, and abelian group
- perform computations using permutations
- give examples of various kinds of groups
- perform transformations using isometries, homomorphisms, isomorphisms and group actions
- state and prove various theorems, including (but not limited to) Cayley's Theorem, Cauchy's Theorem, Lagrange's Theorem, Sylow's Theorems, and Burnside's Lemma.

A few words need to be said about the Internet aspect of this course. All

assignments, notes, announcements, etc will be posted on Blackboard. All students enrolled in an Internet course should have basic computer skills (such word processing, e-mail, navigating the Internet, etc). Some tips on preparing yourself for an online course are available at www.nicholls.edu/distance. As an online student, you will be somewhat self-paced. This therefore requires self-discipline and self-motivation. The problem sets need to be turned in on time. It is the responsibility of the student to notify the instructor of technical and/or personal problems that may interfere with online participation. All students must have an e-mail account that they check regularly. E-mail will be our primary means of communication. If you need more personalized assistance, I invite you to contact me (either in person or on the phone) during office hours. Just like a typical class, instances of academic dishonesty, such as plagiarism, will not be tolerated.

Grading Policy: Your course grade will be composed of a problem set grade (50%), an in-class midterm exam grade (25%), and a take-home final exam grade (25%). I will assign a reading assignment almost every week and a few days later a related problem set. You will generally have a week to work on each problem set.

Disability: If you have a documented disability that requires assistance, you will need to register with the Office of Disability Services for coordination of your academic accommodations. The Office of Disability Services is located in Peltier Hall, Room 100-A. The phone number is (985) 448-4430 (TDD 449-7002).