SYLLABUS

**Course**:                     MAT 421 Modern Algebra

**Text**:                           Elements of Modern Algebra, 6th Edition, Gilbert and Gilbert

**Catalog Description**:

**MAT 421 Modern Algebra                                                                           Credit, 3 sem. hrs.**

*Prerequisites: MAT 301*

A study of groups, rings, integral domains and fields.

**Rationale for Course:**Modern Algebra entails an examination of the common structures which unite such mathematically diverse objects as integers, rational numbers, real numbers, complex numbers, matrices, polynomials, integers with modular arithmetic, symmetries on a geometric figure and continuous functions.  The results and concepts of modern algebra play important roles in higher mathematics, physics, chemistry, and computer science.

**Learning Objectives:**  At the conclusion of the course, the successful student should be able to define, explain, discuss, and apply the concepts of groups, rings, integral domains, and fields and related abstract mathematical concepts.  Topics include:

-binary operations on numbers, functions and matrices

-properties of relations including equivalence relations and equivalence classes

-proof by induction

-the division algorithm and the Euclidean algorithm

-the fundamental theorem of arithmetic

-congruence modulo n

-binary coding and cryptography

-groups, subgroups and Cayley tables

-cyclic groups and subgroups and their generators

-group homomorphisms and isomorphisms

-permutation groups and Cayley’s theorem

-cosets and Lagrange’s theorem

-normal subgroups and the Fundamental Theorem of group homomorphisms

-rings and subrings

-integral domains and fields

-ideals and the Fundamental Theorem of Ring Homomorphisms

-polynomials over a commutative ring

-irreducible polynomials and the Unique Factorization Theorem

-the Fundamental Theorem of Algebra

**Academic Integrity**: Honesty and integrity are basic virtues expected of all students at Mississippi College.  The*Mississippi College Tomahawk* lists the policies and penalties for plagiarism and cheating.  This information can also be found online by going to <http://www.mc.edu/publications/policies/> and following the link to Policy 2.19.

**Learning Environment:**  The method of instruction will include lecture, group problem solving, individual problem solving, quizzes and examinations.  Each student is expected to have a copy of the text, writing materials, a calculator and an open mind.  On tests, quizzes, and individual out-of-class projects, the work is assumed to be the student's own and no cheating will be tolerated.

**Disability Accommodation:**  If you need special accommodations due to learning, physical, psychological, or other disabilities, please contact Dr. Buddy Wagner in the Counseling and Career Development Center.  He may be reached by phone at 925-3354 or by mail at P. O. Box 4016, Clinton, MS 39058.

**Assessment:**  Assessment of the student's progress will be made through quizzes and examinations as well as through classroom feedback.  There will be two unit examinations (worth 100 points each), daily work (quizzes and other projects worth a total of 150 points) and a comprehensive final examination (worth 150 points). The final grade will be determined by the following scale:

            450-500 points                      A

            400-449 points                      B

            350-399 points                      C

            300-349 points                      D

            Below 300 points                  F

Makeup work is the responsibility of the student and should be cleared with the instructor **in advance** whenever possible.  There are no makeups for quizzes. Out-of-class assignments are to be turned in at the start of the class on the date they are due.  Late work will be accepted only until the next class period and with a grade penalty. The College stipulates that the grade for the course is automatically an F in the event of missing 12 or more of the classes.