Mathematics 483 Abstract Algebra III

1. Catalog Description

    MATH 483 Abstract Algebra III   **4 units**

    Prerequisite: MATH 482.

    Algebraic field extensions, the tower law, ruler-and-compass constructions, the primitive element theorem, algebraic and transcendental numbers, algebraic closure, the fundamental theorem of algebra, finite fields, Galois extensions and the fundamental theorem of Galois theory. Not open to students with credit in MATH 560. 4 lectures.

2. Required Background or Experience

    Math 482

3. Learning Objectives

    The student should:

    a. Know and be able to use the basic definitions and theorems of modern algebra.
    b. Recognize how these definitions and theorems relate to concepts from previous mathematics courses.
    c. Understand that groups, rings, and fields are specialized sets and that they codify the interesting characteristics of the familiar number systems, while homomorphisms on these objects are specialized functions which preserve algebraic structure.

4. Text and References

    To be chosen by the instructor. Suggested texts include:

    - Fraleigh, J., A First Course in Abstract Algebra
    - Gallian, Joseph A., Contemporary Abstract Algebra
    - Nicholson, W.K., Introduction to Abstract Algebra
    - Rotman, Joseph J. A First Course in Abstract Algebra

5. Minimum Student Materials

    Paper, pencils and notebook.

6. Minimum University Facilities

    Classroom with ample chalkboard space for class use.

7.   Content and Method

      Topics

      a. Field extensions
      b. Normal and separable extensions
      c. Automorphisms of fields
      d. The Fundamental Theorem of Galois Theory
      e. Additional topics include:
      f. Cyclotomic extensions
      g. Solvable groups
      h. The insolvability of the quintic

8.   Methods of Assessment

      Comprehensive final exam, mid-term exams or quizzes, homework.