MATH 513. ADVANCED ALGEBRA (3)
Three hours of lecture per week
Prerequisite: Admission to the Computer Science or Mathematics Graduate Program
Topics include: Techniques of Group Theory, Rings Fields, Modules, Galois Theory, Algebraic Number Theory, Algebraic Geometry, Techniques of Linear Algebra, Noncommutative Algebra, and Homological Algebra.

2. Mode of Instruction.

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<tr>
<th>Lecture</th>
<th>Units</th>
<th>Hours per Unit</th>
<th>Benchmark Enrollment</th>
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<td>Seminar</td>
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<td>Activity</td>
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3. Justification and Learning Objectives for the Course. (Indicate whether required or elective, and whether it meets University Writing, and/or Language requirements) [Use as much space as necessary]

This course is an elective for the proposed MS in mathematics. Students in the course will learn recent advances and applications of algebra in various contexts.
Through this course, students will be able to

- Describe and classify algebraic structure
- Apply algebraic methods in various problems
- Discuss and use linear algebra methods
- Use Noncommutative Algebra
- Apply Galois Theory
- Express algebraic ideas and its application in oral and written form.

This course is not designed to satisfy the University Writing or Language requirements.

4. Is this a General Education Course YES NO

5. Course Content in Outline Form. [Be as brief as possible, but use as much space as necessary]

Groups and applications, 
Rings, Fields and applications
Modules
Techniques of Group Theory, 
Galois Theory

NEWCRSFR 9/30/02
6. References. *(Provide 3 - 5 references on which this course is based and/or support it.)*

A First Graduate Course in Abstract Algebra, W. J. Wickless, Published By: Marcel Dekker, Inc., 2004
Algebra *(Graduate Texts in Mathematics)* by Thomas W. Hungerford, Springer Verlag, 2004

7. List Faculty Qualified to Teach This Course.

   Mathematics Faculty

8. Frequency.
   a. Projected semesters to be offered: Fall ___X__ Spring _X___ Summer _____

9. New Resources Required.
   a. Computer (data processing), audio visual, broadcasting needs, other equipment
      None
   b. Library needs
      None
   c. Facility/space needs
      None

10. Consultation.
    Attach consultation sheet from all program areas, Library, and others (if necessary)

11. If this new course will alter any degree, credential, certificate, or minor in your program, attach a program modification.

Jesse Elliott 10/31/03

Proposer of Course Date
Approvals

Program Coordinator    Date

GE Committee Chair    Date
(If applicable)

Curriculum Committee Chair    Date

Dean    Date

Effective Semester: ___________________________
1. Course prefix, number, title, and units: _____ MATH 482 NUMBER THEORY AND CRYPTOGRAPHY (3)

2. Program Areas: _____ MATH

### Recommend Approval

<table>
<thead>
<tr>
<th>Program Area/Unit</th>
<th>Program/Unit Coordinator</th>
<th>YES</th>
<th>NO (attach objections)</th>
<th>Date</th>
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* If needed