LSC Use Only
Number: _____
Submission Date: _____
Action-Date: _____

UWUCC USE Only
Number: _01-62 e_
Submission Date: _____
Action-Date: UWUCC App -4/16/02
Senate App 5/7/02

CURRICULUM PROPOSAL COVER SHEET
University-Wide Undergraduate Curriculum Committee

I. **CONTACT**

Contact Person __Gerald Buriok__ Phone __7 2608__

Department __Mathematics__

II. **PROPOSAL TYPE (Check All Appropriate Lines)**

__X__ COURSE __MATH 214 Discrete Mathematics__
Suggested 20 character title

_____ New Course* _____
Course Number and Full Title

__X__ Course Revision __MATH 214 Discrete Mathematics__
Course Number and Full Title

_____ Liberal Studies Approval + _____
for new or existing course
Course Number and Full Title

_____ Course Deletion _____
Course Number and Full Title

_____ Number and/or Title Change _____
Old Number and/or Full Old Title

_____
New Number and/or Full New Title

__X__ Course or Catalog Description Change __MATH 214 Discrete Mathematics__
Course Number and Full Title

_____ PROGRAM: _____ Major _____ Minor _____ Track

_____ New Program* _____
Program Name

_____ Program Revision* _____
Program Name

_____ Program Deletion* _____
Program Name

_____ Title Change _____
Old Program Name

_____
New Program Name

III. **Approvals (signatures and date)**

Mary Stewart 10/1/01
Department Curriculum Committee

Gerald Buriok 10/1/01
Department Chair

_____ 2/26/02
College Curriculum Committee

John D. Eck 2/27/02
College Dean

+Director of Liberal Studies (where applicable)   *Provost (where applicable)

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Part II. Description of Curriculum Change

1. New syllabus of record. (Attached.)

2. Summary of proposed revisions.

The proposed change is in the prerequisite, replacing "MATH 123, 127, or 122" with "MATH 122 or 123."

a. Proposed new catalog description:

MATH 219 Discrete Mathematics   **3c-0l-3sh**

Prerequisite: COSC 110 and MATH 122 or MATH 123

Topics include set algebra, mappings, relations, semigroups, groups, directed and undirected graphs, Boolean algebra, and prepositional logic, with examples and applications of these to various areas of computer science. Emphasis is placed on developing an intuitive understanding of basic structures rather than formal theories and influence of these topics on theory and practice of computing.

b. Old catalog description

MATH 219 Discrete Mathematics   **3c-0l-3sh**

Prerequisite: COSC 110 and MATH 123, 127, or 122.

Topics include set algebra, mappings, relations, semigroups, groups, directed and undirected graphs, Boolean algebra, and prepositional logic, with examples and applications of these to various areas of computer science. Emphasis is placed on developing an intuitive understanding of basic structures rather than formal theories and influence of these topics on theory and practice of computing.

3. Justification/rationale for change.

Several years ago there was a three-semester calculus sequence MA 127 Calculus I, MA 128 Calculus II, and MA 227 Calculus III. This sequence was deactivated in 1998 and we wish to remove all reference to these courses from the catalog.

4. Old syllabus of record. (Attached.)

5. Liberal Studies course approval form and checklist. (Not applicable.)

Part III. Letters of Support. (Attached.)

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New Syllabus of Record

I.   Catalog Description

        MATH 219 Discrete Mathematics

                                                3 semester hours
                                                3 lecture hours
                                                0 lab hours
                                                (3c-0l-3sh)

        Prerequisites: COSC 110 and MATH 123, or MATH 122

        Topics include set algebra, mappings, relations, semigroups, groups, directed and undirected graphs,
        Boolean algebra, and propositional logic, with examples and applications of these various areas of computer
        science. Emphasis is placed on developing an intuitive understanding of basic structures rather than formal
        theories and influence of these topics on theory and practice of computing.

II.   Course Objectives

        1.   Students will know the basics of logic, set theory, and relations
        2.   Students will know set theoretical, graphic, and matrix interpretations of relations.
        3.   Students will know classifications of relations based on properties they satisfy.
        4.   Students will know applications of various types of relations to computer science.
        5.   Students will know basic structures of abstract algebra and their applications to computer science.

III.   Course Outline/Time Schedule:

        A.   Fundamentals (8-9 hours)
                1.   Sets and Subsets
                2.   Sequences
                3.   Operations on Sets
                4.   Counting Sequences and Subsets
                5.   Algorithms and Pseudocode
                6.   Induction and Recursion
                7.   Division in the Integers
                8.   Matrices
        B.   Relations and Digraphs (7 hours)
                1.   Product Sets and Partitions
                2.   Relations and Digraphs
                3.   Paths in Relations and Digraphs
                4.   Properties of Relations
                5.   Computer Representations of Relations and Digraphs
                6.   Manipulation of Relations
                7.   Connectivity and Warshall's Algorithm
        C.   Functions (3-4 hours)
                1.   Functions
                2.   Permutations
        D.   Trees and Languages (7-8 hours)
                1.   Trees
                2.   Labeled Trees
                3.   Languages
                4.   Representations of Special Grammars
                5.   Tree Searching
                6.   Undirected Trees

E. Semigroups and Groups (6-7 hours)
    1. Binary Operations
    2. Semigroups
    3. Products and Quotients of Semigroups
    4. Groups
    5. Products and Quotients of Groups
F. Finite-State Machines and Languages (5-6 hours)
    1. Finite-State Machines
    2. Semigroups, Machines, and Languages
    3. Machines and Regular Languages
    4. Simplification of Machines

Depending on orientation and time, one may include the following topics.

G. Order Relations and Structures (6-7 hours)
    1. Partially Ordered Sets
    2. Extremal Elements of Partially Ordered Sets
    3. Lattices
    4. Boolean Algebra
    5. Implementation of Boolean Functions
H. Groups and Coding
    1. Coding of Binary Information and Error Detection (3-4 hours)
    2. Decoding and Error Correction

IV. Method of Instruction

This course is taught in a traditional classroom setting involving lecture, student participation in class, homework assignments, and written in-class evaluations. Computer programming assignments are optional.

V. Evaluation Methods

The final grade for the course will be determined as follows:
    25% weekly quizzes and/or collected homework assignments.
    75% three exams and a comprehensive final examination.

Grades will be assigned as follows:
    A: 90%-100%
    B: 80%-89%
    C: 70%-79%
    D: 60%-69%
    F: 0%-59%

VI. Required Textbooks, Supplemental Books and Readings

Required Textbook: Kolman, Bernard, and Busby, Robert, and Ross, Sharon Cutler, Discrete Mathematical Structures for Computer Science, 4th Ed., Prentice Hall, New Jersey, 2000.

VII. Special Resource Requirements.

None.

VIII. Bibliography

Dossey, John, et al. Discrete Mathematics, (4th ed.), New York: HarperCollins, 2001.

Rosen, Kenneth. *Discrete Mathematics /Applications.* (4th ed), New York, WCB/McGraw Hill, 1999.

Grimaldi, Ralph. *Discrete and Combinatorial Mathematics,* (4th ed.), New York, Addison Wesley Longman Inc, 1998.

MA 219

Mathematics Department
Indiana University of Pennsylvania
Indiana, PA 15705

Course Number:	MA 219
Course Title:	Discrete Mathematics
Credits:	3 semester hours
Prerequisites:	CO 110 and MA 123, MA 127, or MA 122
Textbook:	Discrete Mathematical Structures for Computer Science by Kolman and Busby Prentice Hall
Revised:	9/92

Catalog Description:

Topics include set algebra, mappings, relations, semigroups, groups, directed and undirected graphs, Boolean algebra, and propositional logic, with examples and applications of these various areas of computer science. Emphasis is placed on developing an intuitive understanding of basic structures rather than formal theories and influence of these topics on theory and practice of computing.

Course Outline/Time Schedule:

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    A. Sets and Subsets
    B. Sequences
    C. Operations on Sets
    D. Counting Sequences and Subsets
    E. Algorithms and Pseudocode
    F. Induction and Recursion
    G. Division in the Integers
    H. Matrices

II. Relations and Digraphs (7 hours)
    A. Product Sets and Partitions
    B. Relations and Digraphs
    C. Paths in Relations and Digraphs
    D. Properties of Relations
    E. Computer Representations of Relations and Digraphs
    F. Manipulation of Relations
    G. Connectivity and Warshall's Algorithm

III. Functions (3-4 hours)
    A. Functions
    B. Permutations

IV. Trees and Languages (7-8 hours)
    A. Trees
    B. Labeled Trees
    C. Languages
    D. Representations of Special Grammars
    E. Tree Searching
    F. Undirected Trees

V.   Semigroups and Groups(6-7 hours)
     A.   Binary Operations
     B.   Semigroups
     C.   Products and Quotients of Semigroups
     D.   Groups
     E.   Products and Quotients of Groups

VI.   Finite-State Machines and Languages(5-6 hours)
     A.   Finite-State Machines
     B.   Semigroups, Machines, and Languages
     C.   Machines and Regular Languages
     D.   Simplification of Machines

Depending on orientation and time, one may include the following topics:

VII.   Order Relations and Structures(6-7 hours)
     A.   Partially Ordered Sets
     B.   Extremal Elements of Partially Ordered Sets
     C.   Lattices
     D.   Boolean Algebra
     E.   Implementation of Boolean Functions

VIII. Groups and Coding
A.   Coding of Binary Information and
     Error Detection(3-4 hours)
       B.   Decoding and Error Correction

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Read this disclaimer.

Maintained by H. Edward Donley <hedonley@grove.iup.edu>
Last Modified on Friday, 06-Sep-96 18:20:15 EDT

Mathematics Department Curriculum Changes

Response Form

✓ The Mathematics Department has informed me of the proposed changes listed
below, and I support these changes.

___ The Mathematics Department has informed me of the proposed changes listed
below, and I do not support these changes.

Comments:

Computer Science
Department

Gary L Butenbaugh / June 18, 2001
Chairperson   Date

1. Delete MATH 127 from prerequisite list for MATH 219.