A. Course Description

Credits: 4

Lab Hours/ Weeks: Corequisites: None

Lecture Hours/ Week:

MnTC Goals: None

This course provides the background for teaching contemporary mathematics in the elementary school. The use of mathematics manipulatives for modeling the basic operations is emphasized. Set theory, numeration, and the system of whole numbers, integers and rational numbers are considered. Requirements include knowing what mathematics is expected of and taught to K-6 learners. Mathematics is taught as an integrated and continuous curriculum.

B. Course Effective Dates: 08/26/2006 - Present

C. Outline of Major Content Areas:

See Course Description for major content areas.

D. Learning Outcomes (General)

1. Concepts and techniques of discrete mathematics and how to use them to solve problems from areas including graph theory, combinatorics, and recursion and know how to: help students investigate situations that involve counting finite sets, calculating probabilities, tracing paths in network graphs, and analyzing iterative procedures; and apply these ideas and methods in settings as diverse as the mathematics of finance, population dynamics, and optimal planning.
2. Concepts of mathematical patterns, relations, and functions, including the importance of number and geometric patterns in mathematics and the importance of the educational link between primary school activities with patterns and the later conceptual development of important ideas related to functions and be able to: identify and justify observed patterns; generate patterns to demonstrate a variety of relationships; and relate patterns in one strand of mathematics to patterns across the discipline.
3. Concepts of numerical literacy: possess number sense and be able to use numbers to quantify concepts in the students' world; understand a variety of computational procedures and how to use them in examining the reasonableness of the students' answers; understand the concepts of number theory including divisibility, factors, multiples, and prime numbers, and know how to provide a basis for exploring number relationships; and understand the relationships of integers and their properties that can be explored and generalized to other mathematical domains.
4. Concepts of randomness and uncertainty: probability as a way of describing chance in simple and compound events; and the role of randomness and sampling in experimental studies.
5. Concepts of space and shape: understand the properties and relationships of geometric figures; understand geometry and measurement from both abstract and concrete perspectives and identify real world applications; and know how to use geometric learning tools such as geoboards, compass and straight edge, ruler and protractor, patty paper, reflection tools, spheres, and platonic solids.
6. Data investigations: use a variety of conceptual and procedural tools for collecting, organizing, and reasoning about data; apply numerical and graphical techniques for representing and summarizing data; interpret and draw inferences from data and make decisions in a wide range of applied problem situations; and help students understand quantitative and qualitative approaches to answering questions and develop students' abilities to communicate mathematically.
7. Mathematical perspectives: understand the history of mathematics and the interaction between different cultures and mathematics and know how to integrate technological and nontechnological tools with mathematics.
8. Mathematical processes: know how to reason mathematically, solve problems, and communicate mathematics effectively at different levels of formality; understand the connections among mathematical concepts and procedures, as well as their application to the real world; understand the relationship between mathematics and other fields; and understand and apply problem solving, reasoning, communication, and connections.

E. Learning Outcomes (MN Transfer Curriculum)
This contains no goal areas.

G. Special Information

Note: Does not satisfy GELS requirements. This course is a prerequisite for Urban Elementary Education majors.