



# Mathematical Thinking for Instruction (MTI) Course Descriptions

The MTI courses will focus on how students successfully learn math. These courses are designed to support teachers by educating them about the latest research on how children learn mathematics and how to effectively teach mathematics. Below are more detailed descriptions of each of the courses.

## **Mathematical Thinking for Instruction Course (MTI) Grades K-3, 3 credits**

This course provides an opportunity to study fundamental mathematical theory underlying the content area of number and operation and student reasoning of number and operation topics. Topics will include child cognitive development, early numeracy, issues of number, meanings of operations and how they relate to one another, and computation within the number system as a foundation for algebra. Emphasis will be given to developing ideas of student mathematical development, increasing participants' content knowledge, and instructional practices that promote student understanding of mathematics.

## **Mathematical Thinking for Instruction Course (MTI) Grades 4-8, 3 credits**

This course provides an opportunity to study fundamental mathematical theory underlying the content area of number and operation and student reasoning of number and operation topics. Topics will include number systems, ways of representing numbers, meanings of operations and how they relate to one another, and computation within the number system as a foundation for algebra. Emphasis will be given to developing ideas about multiplicative thinking and proportional reasoning.

## **Mathematical Thinking for Instruction Course (MTI) Grades 6-12, 3 credits**

This course provides an opportunity to study fundamental mathematical theory underlying the content area of number and operation and structures of algebraic thinking. Topics will include working with qualitative and quantitative change and the need to describe and predict variation, the use of mathematical models and the understanding student thinking. Emphasis will be given to developing ideas about algebraic reasoning.

## **Mathematical Thinking for Instruction Course (MTI) Grades 9-12, 3 credits**

This course examines topics in number and operations and algebra that are foundational to an understanding of Algebra I & II, Pre-Calculus, and Calculus, and the way that students develop an understanding of these ideas. Topics will include algebraic reasoning, generalizing, functions, variation and co-variation, and modeling. Emphasis will be given to developing teachers' understanding of these mathematical ideas as well as students' reasoning and development.