Administrative Unit: Education Department

Course Prefix and Number: EDUC 360

Course Title: Teaching Mathematics in the Secondary School

Number of: Credit Hours: 3  Lecture Hours: 3  Laboratory Hours: 0

Catalog Description: This course is designed to not only encourage pre-service teachers to explore aspects of teaching mathematics, but also to enhance pre-service teachers’ content knowledge of “school” mathematics. Considerable emphasis will be placed on exploring multiple ways to make mathematics comprehensible to all of their future students. In addition, issues pertaining to lesson planning and implementation, assessment, integration of appropriate models, mathematics connections, and the use of technology will be explored. Includes observation/participation in appropriate school settings. Field experience is 15 hours. $20 lab fee. Offered odd Spring (2nd eight weeks).

Prerequisite(s)/Corequisite(s): EDUC 101, EDUC 300; admission to the Teacher Certification Program and instructor’s permission (must be obtained at least one semester prior to taking this course).

DESE Quality Indicators Targeted: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, and 11.

Text(s): Most current editions of the following:

National Council of Teachers of Mathematics (NCTM), *Principles and Standards for School Mathematics (PSSM)*.

National Council of Teachers of Mathematics (NCTM), *Empowering the Beginning Teacher of Mathematics: High School*

*Missouri Frameworks for Curriculum Development in Mathematics (K-12).*

*Missouri Grade Level Expectations for Mathematics (K-12).*

Released items from the MAP test.

Course Objectives:

- To increase their confidence and ability as teachers of mathematics by developing a deeper understanding of the mathematics they will teach. MoSTEP QI: 1.2.1.1.
- To study and explore a variety of teaching strategies and materials for developing mathematical thinking, including:
  - The role of mathematical tasks in learning concepts;
• The role and value of multiple representations (numerical, graphical, symbolic, and situational) to support the development of mathematical thinking;
• The role and value of appropriate tools (graphing calculators, spreadsheets, manipulatives, applets, the internet, etc.) for developing and connecting mathematical concepts;
• Curriculum materials for supporting learning (e.g. NSF-funded mathematics curriculum and other Standards-based Curriculum);
• Methods to provide learning opportunities for all students to learn mathematics, regardless of individual learning styles or cultural differences. MoSTEP QI: 1.2.1.2., 1.2.3.3., 1.2.3.4., 1.2.4.1., 1.2.5.1., 1.2.11.2, 1.2.11.3.
• To engage, as learners, in mathematical tasks that require critical thinking skills. MoSTEP QI: 1.2.9.1.
• To read and reflect on a number of well-known and recently published works in mathematics education in order to support an understanding of research-based knowledge regarding the learning and teaching of mathematics. MoSTEP QI: 1.2.1.3., 1.2.1.4., 1.2.2.3., 1.2.2.4., 1.2.3.1., 1.2.3.2., 1.2.3.4., 1.2.4.1., 1.2.4.2., 1.2.5.2., 1.2.6.2., 1.2.7.1., 1.2.7.3., 1.2.7.4., 1.2.9.3.
• To examine personal beliefs about the learning and teaching of mathematics. MoSTEP QI: 1.2.2.4., 1.2.6.1., 1.2.9.2.
• To examine issues of assessment pertaining to the understanding of mathematics concepts. MoSTEP QI: 1.2.8.1., 1.2.8.2., 1.2.8.3., 1.2.8.4., 1.2.11.4.
• To become aware of and participate in professional organizations for mathematics teachers. MoSTEP QI: 1.2.9.2.

Measurable Learning Outcomes:
• Establish curriculum goals and objectives, plan daily lesson plans, and develop evaluation instruments.
• Use a variety of strategies such as cooperative learning discussion, discovery, problem-based learning, modeling, and direct instruction in teaching mathematics.
• Demonstrate effective ways to integrate technology and manipulatives into the teaching and learning of mathematics.
• Solve problems using multiple solution strategies in order to analyze mathematical concepts and skills and determine how the problems could be used in teaching mathematics.
• Demonstrate effective written and oral communication skills, including effective questioning techniques to enhance student learning and methods to stimulate critical thinking and problem-solving.
• Describe the complex interrelationships among classroom management, discipline, classroom practices, and motivation that exist in the mathematics classroom.

• Use literature, research, professional organizations, and other resources to design a plan for continued professional development.

• Describe the teacher’s role and the students’ roles in the mathematics classroom with regard to diversity of the student population and the various individual learning styles.

• Select teaching resources and curriculum materials designed to enhance students’ understanding of mathematics

Topical Outline (major areas of coverage):

• State and National Standards: NCTM, PSSM, MO Frameworks, GLEs
• Mathematical Tasks
• The principles for school mathematic: Equity, Curriculum, Teaching, Learning, Assessment, Technology
• Number and Operation Standard
• Algebra Standard
• Geometry Standard
• Measurement Standard
• Data Analysis Standard
• Probability Standard
• Problem-Solving
• Reasoning and Proof
• Communication
• Connections
• Representation
• Curriculum Materials
• Classroom Management
• Teaching Strategies
• Professional Development
• School and Community
• National, State, and Classroom Assessment
• Teaching with Technology
• Modeling with Manipulatives

Material from this course may be tested on the Major Field Test (MFT) administered during the Culminating Experience course for the degree.

Recommended maximum class size for this course: 20

Library Resources: Online databases are available at http://www.ccis.edu/offices/library/resources.asp. You may access them from off-campus using your eServices login and password when prompted.
Date: January 6, 2006

NOTE: The intention of the master syllabus is to provide an outline of the contents of this course, as specified by the faculty of Columbia College, regardless of who teaches the course, when it is taught or where it is taught. Faculty members teaching this course for Columbia College are expected to facilitate learning pursuant to the course objectives and cover the subjects listed in the topical outline. However, instructors are also encouraged to cover additional topics of interest so long as those topics are relevant to the course’s subject. The master syllabus is, therefore, prescriptive in nature but also allows for a diversity of individual approaches to course material.

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