OFFICIAL SYLLABUS

DISCIPLINE: EDUC
COURSE: 410

A. Catalog Entry

EDUC 410: Teaching and Learning Elementary Mathematics
Prerequisites: Admission to the Teacher Education Program
Credit Hours: (3) Three hours lecture

This pedagogy course builds on the mathematics courses taken by students and provides the skills needed to be effective elementary school educators. Students discuss applications of learning theories to mathematics education and are provided with concrete experiences that can be utilized in the elementary classroom. The incorporation of national and state standards in planning and instruction will be modeled.

B. Detailed Description of Course

Part One: What is Mathematics? What is the Mathematics Reform?

We will reflect upon our own experiences, feelings, and beliefs about mathematics. We will then look at mathematics as a discipline, and compare more traditional ideas about what it means to 'know' and 'do' mathematics to the vision of mathematics advocated by the reform movements.

What does it mean to "understand" a concept in mathematics?

What does it mean to "do" mathematics?

What is the purpose of learning mathematics? What might the purpose be?

Part Two: How do children learn mathematics?

In the second portion of the course, we will take a closer look at how children think about mathematics. We will learn to listen carefully to children's mathematical thinking, and to use what we hear and see to assess children's understanding and plan instruction based on that assessment. We will think about issues such as:

What makes a 'good mathematical task', and how can a good task support students' learning?

How do children make sense of numbers and operations, such as addition, subtraction, multiplication and division?

What strategies do children often use? How do those strategies progress over time?

How can tools (including manipulatives, calculators, and other technology) assist children in their thinking and problem solving?

Part Three: How do we plan and implement lessons that promote understanding, proficiency, and confidence?

In part three, we will focus on issues related to teaching and learning mathematics in a classroom setting. We will discuss the roles of students and teachers in the classroom, the role that communication plays in learning, and ways to foster a classroom environment that encourages children to effectively communicate their thinking as well as listen respectfully to others. We will learn about a variety of lesson planning / assessment formats and small groups will collaborate to create and implement a mathematics lesson with students. We will consider questions such as:

What are the roles of a teacher in a math classroom? What are the roles of the students?

How can we promote discussion in the classroom?

What do we need to think about when planning and implementing a mathematics lesson?

How can we adjust our instruction based on what we learn from students?

C. Detailed Description of Conduct of Course

This course will involve discussions of the topic at hand (both whole group and small group), numerous opportunities for reflection, and student presentations. There will be some lecture, but that will be kept to a minimum. The members in the course will also conduct 2 or 3 clinical interviews with children at their early field experience placement.

D. Student Goals and Objectives of the Course

Goals, objectives, and assignments in this class address NCATE Standards 1b-Pedagogical content knowledge, 1c -Professional and pedagogical knowledge and skills for teacher candidates, and 1g – professional dispositions. The codes below stand for: Association for Childhood Education International (ACEI); Virginia DOE-General Content-VGC.

1. Students will distinguish between various types of mathematical word problems for purpose of using the knowledge to plan effective instruction for all students. (ACEI 2.3, 3.1, 3.2, 3.3, 4.0; VGC 1a, 1c)
2. Students will understand children's thinking when watching them solve problems (ACEI 1, 3.1, 3.2; VGC 1f, 1h)
3. Students will understand why a child is struggling with solving a problem and make appropriate adjustments. (ACEI 1, 3.2; VGC 1g, 5e(3))
4. Students will learn effective questioning as a tool to elicit information regarding a child's understanding. (ACEI 4; VGC 1a, 1g)

5. Students will know how constructivism influences their lessons when teaching for understanding (ACEI 3.1; VGC 1a)
6. Students will plan lessons that allow students to solve problems and gain understanding from the process of solving problems. (ACEI 3.1, 3.2, 3.4, 4.0; VGC 1c, 1f, 1g, 1h, 1j, 5e(3))
7. Students will understand how to accommodate the needs of **all** students in their classroom (i.e. gifted, gender, LD children, ELL, race, ethnicity, SES, etc.) (ACEI 1.0, 3.2; VGC 1f)
8. Students know how to use continual informal assessment to plan their instruction, thus enabling them to meet each students individualized needs. (ACEI, 3.1, 3.2, 4.0; VGC 1g)

E. Assessment Measures

1. Comparison project
2. Child interview assignment (throughout entire semester students will interview one child and assess their understanding of various topics in mathematics). The final project will be an analysis of their child's understanding of mathematics based on the results from their interviews. This will involve synthesizing what they know about the child and using the current research presented in class to make their conclusions. This final project will also ask them to reflect on the experience of conducting the interviews and how it will influence their teaching.-**Final project for course in lieu of final exam**
3. Planning for instruction (adaptation from previously created lesson plan)-create lesson plan from online source.
4. Planning for instruction (integrating multiple subjects)-create an activity for a lesson integrating geometry and visual art SOL, which can be tied to social studies unit. The write up for this assignment includes appropriate SOL from geometry and visual arts, consideration and accommodations of diversity and a summary of how the activity integrates the various content.-**This assignment contributes data to the program's NCATE task (planning for instruction**
5. Attendance and participation
6. Equity and diversity project-create presentation for principals, teachers and parents of low achieving elementary school to persuade all groups that the philosophy developed in the course will be effective in aiding in the school's low math scores. Multiple uses of media are encouraged. **This assignment satisfies TSIPS 3.**

F. Other Course Information

None