EL802 Improving Instruction in Elementary Mathematics
Summer Semester – June 7th – July 23rd
(3 graduate credits)
Internet Course

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Course Description:
This course is designed to provide graduate students in elementary education an opportunity to experience and examine recommended instructional techniques and materials for teaching mathematics in the elementary school. Participants will be actively involved with a variety of mathematical concepts, will review research results and recommendations for teaching those concepts, and implement effective strategies for teaching those concepts.

Learning activities will include:
1. Assigned readings
2. Class Discussions
3. Activities
4. ILPs

The mission of The Teachers College, the school personnel preparation unit of Emporia State University, is to develop professionals who are critical thinkers, creative planners, and effective practitioners. Our graduates are skilled practitioners who are prepared with essential knowledge, skills, and dispositions in their fields of specialization. Candidate learning reflects historical and contemporary knowledge, research, theory, and practice that meet the academic, personal, and social needs of their students. The vision of The Teachers College and personnel preparation unit is to prepare quality professionals who can positively impact the education profession and improve the learning of PK-12 students.
Professional programs are designed to reflect the current knowledge base and effective practices. Curricular coherence is strengthened through faculty study and dialogue on purpose, course content, and intended candidate learning outcomes.

**Course Outcomes:**
Upon successful completion of this course, candidates will demonstrate skills that will assist them to be professionals who are critical thinkers, creative planners, and effective practitioners. Candidates will be expected to:

1. **Summarize relevant research on the effective teaching of mathematics content, characteristics of contemporary and progressive mathematics programs, and recommendations in NCTM’s Standards documents.**
   (ESU Teachers College Conceptual Framework) Proficiency 2

2. **Demonstrate, analyze, and critique recommended instructional and assessment strategies for developing mathematical concepts and skills.**
   (ESU Teachers College Conceptual Framework) Proficiencies 2 and 3

3. **Use technology to enhance professional and student learning.**
   (ESU Teachers College Conceptual Framework) Proficiency 3

The conceptual framework can be found in Blackboard in the course documents.

**Kansas Elementary Mathematics: Standard 2**
The kindergarten through sixth grade teacher knows, understands, and uses the major concepts, procedures, and reasoning processes of mathematics that define numbers and operations, geometry, measurement, data analysis and probability, and algebra so that all students understand relationships that can represent phenomena, solve problems, and manage data.

**Note:** Text underlined and parentheses has been added to the original standards for clarification.

**Performance:**
1. Appropriate to students’ age and development, the teacher can use and apply, demonstrate, and teach the concepts of:

**Number and Operations**
   - **Number sense** (Including understanding of number, multiple representations of numbers, relationships among numbers, and estimation of quantity.)
   - **Number systems and their properties** (Including natural, whole, integers, rational, irrational, and complex numbers; place value and number theory.)
   - **Computation** (Including meaning of operations, operation relationships, use of manipulative and concrete models; computational fluency and choice among paper-and-pencil algorithms, mental math strategies, technology and estimation strategies; and reasonableness of results.)

**Geometry and Measurement**
   - **Geometric Figures and their Properties** (Including analysis of characteristics of 2- and 3-dimensional figures such as symmetry, congruence, and similarity.)
   - **Transformational geometry** (Including visualization, spatial relationships, and locations to include coordinate geometry.)
   - **Measurement** (Including units; systems; attributes that can be measured and estimated such as length, area, volume, capacity, angle measure, weight and mass, time and temperature; tools; processes; and formula development and usage.)
Data Analysis and Probability

Data analysis (Including formulating questions and making predictions or inferences, collecting, displaying, analyzing data using measures of central tendency and variation, and communicate appropriate conclusions.)

Data representations (Including graphs and plots such as bar graph, line graph, circle graph, pictograph, histograms, line plots, stem-and-leaf plots, scatter plots, and box plots.)

Probability (Including chance, randomness, fairness, types of events, simulations, and prediction of outcomes based upon experimental or theoretical probabilities.)

Algebra

Patterns (Including recognizing, describing, analyzing, extending and creating a wide variety of patterns.)

Functions (Including continuous and discrete and their use to describe relations and to model a variety of real-world situations.

Representations of algebraic and geometric situations/solutions (Including variable quantities with expressions, equations, and inequalities.)

Instruction and Assessment

2. The teacher integrates the five process standards (problem solving, reasoning and proof, communication, connections and representations) into math instruction.

3. The teacher demonstrates the ability to use effective, developmentally appropriate instructional strategies to help all students learn and use their mathematical skills in many different situations and applications to solve real life problems.

4. The teacher uses diverse and developmentally appropriate assessments that align with curriculum and instruction.

Materials:


Optional Texts: NCTM (2000). Principles and Standards for School Mathematics. (May be found online at www.NCTM.org)

NCTM (2006). Curriculum Focal Points for Prekindergarten through Grade 8 Mathematics. (May be found online at www.NCTM.org)

Evaluation:

Emporia State University will make reasonable accommodations for persons with documented disabilities. Students need to contact the Director of Disability Services and the professor as early in the semester as possible to ensure that classroom and academic accommodations are implemented in a timely fashion. All communication between students, the Office of Disability Services, and the professor will be strictly confidential. To reach the office, contact: 242 SE Morse Hall, 620/341-6637 Voice, 620/341-6646 TTY, or via e-mail disabser@emporia.edu.

Original work and professional behavior is expected of all students. If a source is used which is not original, the source must be identified with an appropriate bibliographic citation. As required by the department's policy on ethical behavior, any incident of unethical behavior will be reported to the Chair of the department and the office of the Dean. The student will receive no credit for the assignment.
Note: All assignments should be submitted by the indicated deadlines. Contact your instructor if you must miss a deadline. To receive credit for the course, all assignments must be completed. Assignments turned in late will receive a 20% deduction in points. If more than two weeks late, 50% will be deducted. Work received after July 25th will receive no credit unless prior arrangements have been made. Always save your work in a word processing file on your computer so you can resend if there are technical difficulties.

Technology notes:
- Assignments should be emailed as an attachment (not typed out in the e-mail) to the instructor at jmorrow@emporia.edu from your ESU stumail account as a Word attachment. Using other email accounts may hinder your communication with your instructor because ESU’s filter is blocking some other accounts. Do not use the Blackboard drop box. The file name for the attachment should include the student’s last name and assignment title. (Ex. Jones_ILP2)
- The instructor will be using your ESU stumail account to correspond with you. Please check it regularly.
- Course materials posted on Blackboard were completed in Microsoft Word. If possible, student assignments should also be completed in Microsoft Word. If you use a different word processing program (e.g., WordPerfect, Microsoft Works, Open Documents) please save them in RTF format before sending a file to me. If you have technical difficulties or need a Word conversion program, ESU has online and telephone help available through Blackboard and ESU’s computing services.

The grading scale is as follows:

- 90% and above (of total points) A
- 80-89% B
- 70-79% C

Assignments can be found in the “Course Assignments” folder on Blackboard.