EE317: Teaching Mathematics in the Elementary School
(3 credit hours)
See PDS Schedule for dates and times of class sessions

Instructor: Sheryl S. Bevis, M.E.T.
Early Childhood/Elementary Teacher Education
VH 233
E-mail: sbevis@emporia.edu
Ph: 913-710-1611

I. Course Description
As outlined in the attached course schedule, candidates will experience and learn about general
teaching elementary mathematics. Topics will include recommendations
from the NCTM Standards, how children learn and develop, teaching diverse learners, lesson
planning, use of manipulatives, use of technology (calculators, computers, interactive
whiteboards, document cameras), and methods of assessment. In the last two-thirds of the
course, candidates will experience and learn about recommendations for teaching specific
mathematics topics. Learning activities will include:

- Assigned readings: textbook, handouts, etc.
- Lecture
- Class participation-discussions, hands-on activities
- Chapter check-ups, case exams
- Field experiences, lesson plans
- Computer activities

II. Required Course Materials

b) Custom Math Manipulative Kit, Cuisenaire, Co. (Also required for MA307 and MA308,
so you should have this already.)

III. Course Objectives and Candidate Outcomes
This course is designed to provide undergraduate candidates in elementary education an
opportunity to experience and become familiar with selected content and various appropriate
instructional technique and materials for teaching mathematics in the elementary school. A
grade of “C” or better must be earned in each Block 2 class to be admitted to Block 3.
The Teachers College Conceptual Framework

Emporia State University’s faculty, including professional education and content area faculty, support a program designed to transform candidates into professionals. To help all students learn, the professional must have a command of content, critical ideas, and skills, and the capacity to reflect on, evaluate, and learn from their practice so that it continually improves. While there are different ways that successful professional educators can be highly effective, six proficiencies emerge from a shared evidence-based understanding of how to foster student learning. These six proficiencies define the Professional: providing service to society; applying interdisciplinary scholarly knowledge; engaging in effective practice; responding to uncertainty and change; relying on self-reflection; and belonging to professional community.

Candidates study, learn, and grow in an academic setting that integrates and highlights the connections among general studies, content studies, professional studies, and clinical experiences. Moreover, the candidate preparing for a career in the field of education or an allied health field is immersed in an academic milieu that values a number of tenets the faculty see as essential for the professional development and growth of teachers, other school personnel, and those in the helping professions: the value of diversity, the relevance of authentic assessment, the essentials of professionalism, the importance of collaboration, the usefulness of technology, and the power of reflection. ESU’s professional education programs as well as the non-professional education programs offered within The Teachers College devote themselves to the proposition that candidates who learn and grow in such an atmosphere and who integrate knowledge, theory, and practice demonstrate the proficiencies of the Professional at the time of program completion.
This course addresses the following Knowledge, Skills, and Dispositions outcomes:

<table>
<thead>
<tr>
<th>KS Professional Standards</th>
<th>Upon successful completion of this course, candidates will demonstrate skills that will assist them in becoming professionals who are critical thinkers, creative planners, and effective practitioners. Candidates will be expected to:</th>
<th>Course Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>1. Examine and critique one’s own performance, progress, and beliefs. (ESU CF 3A2, 3B3, 3C1, 5A2, 5C1)</td>
<td>After-Teaching Reflection</td>
</tr>
<tr>
<td>1, 4, 5, 11, Perf. 1-4</td>
<td>2. Summarize relevant research on the effective teaching of mathematics, characteristics of contemporary and progressive mathematics programs and recommendations from NCTM’s <em>Principles and Standards for School Mathematics</em> and <em>Common Core Standards for Mathematics</em> (ESU CF 2A2, 3A1, 3C2)</td>
<td>Exams</td>
</tr>
<tr>
<td>2</td>
<td>3. Summarize basic principles of human development, teaching diverse learners and provide examples of how development and diversity influences learning mathematics. (ESU CF 1A3, 1B3, 4A1, 4A3, 5A1)</td>
<td>Lesson Plan Exams, Field Experiences</td>
</tr>
<tr>
<td>4, 7, 9, 12, Perf. 3</td>
<td>4. Identify, critique, and use a variety of mathematics education resources available to elementary teachers, including textbooks, manipulatives, teacher resource books, children’s literature, technology such as calculators and computers, professional journals, such as <em>Teaching children mathematics</em>, and organizations, such as NCTM, (ESU CF 2A2, 2B2, 2C1, 3A1, 3C2, 4A2, 4B2, 5B1, 6B2)</td>
<td>Lesson Plans, Field Experiences</td>
</tr>
<tr>
<td>3, 4, 6, Perf. 1-3</td>
<td>5. Summarize, analyze, critique, and demonstrate recommended instructional strategies for teaching mathematical concepts and skills to elementary students. (ESU CF 2A2, 2B2, 2C1, 3A1, 3A3, 3C1, 4A3, 5A2, 5B1, 5B3)</td>
<td>Exams, Lesson Plans, Field Experiences</td>
</tr>
<tr>
<td>1-13 Perf. 1-4</td>
<td>6. Develop, critique, and present elementary mathematics lessons. (ESU CF 1B2, 1B3, 1C2, 2B3, 3B1, 3B2, 3B3, 4B1, 4B2, 4B3, 4C1, 5B1, 5B2, 5C2, 6B1, 6B3)</td>
<td>Lesson Plans, Field Experiences</td>
</tr>
<tr>
<td>8, Perf. 4</td>
<td>8. Summarize, critique, and use a variety of assessment methods including observations, interviews and performance tasks, work samples and portfolios, writing and self-assessment, and classroom and state tests. (ESU CF 2B3, 2C1, 3A1, 5A3, 5B2)</td>
<td>Exams, Lesson Plans, Field Experiences</td>
</tr>
</tbody>
</table>
Kansas Professional Education Standards (Adopted 2001)

1. The educator demonstrates the ability to use the central concepts, tools of inquiry, and structures of each discipline he or she teaches and can create opportunities that make these aspects of subject matter meaningful for all students.

2. The educator demonstrates an understanding of how individuals learn and develop intellectually, socially, and personally and provides learning opportunities that support this development.

3. The educator demonstrates the ability to provide different approaches to learning and creates instructional opportunities that are equitable, that are based on developmental levels, and that are adapted to diverse learners, including those with exceptionalities.

4. The educator understands and uses a variety of appropriate instructional strategies to develop various kinds of students’ learning including critical thinking, problem solving, and reading.

5. The educator uses an understanding of individual and group motivation and behavior to create a learning environment that encourages positive social interaction, active engagement in learning, and self-motivation.

6. The educator uses a variety of effective verbal and non-verbal communication techniques to foster active inquiry, collaboration, and supportive interaction in the classroom.

7. The educator plans effective instruction based upon the knowledge of students, community, subject matter, curriculum outcomes, and current methods of teaching reading.

8. The educator understands and uses formal and informal assessment strategies to evaluate and ensure the continual intellectual, social, and other aspects of personal development of all learners.

9. The educator is a reflective practitioner who continually evaluates the effects of his or her choices and actions on others (students, parents, and other professionals in the learning community), actively seeks out opportunities to grow professionally, and participates in the school improvement process (Kansas Quality Performance Accreditation [QPA]).

10. The educator fosters collegial relationships with school personnel, parents, and agencies in the larger community to support all students’ learning and well-being.

11. The educator demonstrates the ability to integrate across and within content fields to enrich the curriculum, develop reading and thinking skills, and facilitate all students’ abilities to understand relationships between subject areas.

12. The educator understands the role of technology in society and demonstrates skills using instructional tools and technology to gather, analyze, and present information, enhance instructional practices, facilitate professional productivity and communication, and help all students use instructional technology effectively.

13. The educator is a reflective practitioner who uses an understanding of historical, philosophical, and social foundations of education to guide educational practices.
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.

Knowledge
Assessed in MA307 and MA308.
Performance
Note: Text in bold and parentheses has been added to the original standards for clarification.

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.
IV. Professionalism
Your punctuality, regular attendance, and professional participation are appreciated and expected.

Attendance: The Elementary Education Attendance Policy will be followed for this course (see PDS Handbook). A student who misses more than 6 hours (approximately 20% of the class sessions) must confer with the instructor to avoid being dropped from the class. If you must be absent from class, contact the instructor as soon as possible to discuss what you will miss. Due to the interactive and participatory nature of this course, it is difficult to capture the essence of the learning process without class attendance.

Professional Dispositions: To get the most out of our class sessions, and to create a positive classroom learning environment, the following professional behaviors are appreciated and expected.
1. Show respect for your peers and your professor by limiting off-task behaviors and conversations. Be on time and bring all required course materials to class.
2. Participate actively in class and small group discussions. Be willing to share your experiences, thoughts, and ideas with others. Be an active learner. Ask questions to learn more.
3. Participate actively in class activities. Be willing to try something new or challenging.
4. Come to class with the intent to learn all you can about teaching mathematics to children and enjoy this learning opportunity.
5. Turn off your cell phone (or set it on silent), put away your ipods, and focus on the class.

Academic Honesty: Original work is expected of all candidates on exams and written assignments. If a source is used which is not original, the source must be identified with an appropriate bibliographic citation. As required by the division’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 candidate will receive no credit for the assignment.

V. Evaluation

Deadlines: Professionalism is an expectation of teacher candidates. Timely completion of work and attention to deadlines is essential for becoming a successful teacher. Assignments are due in typed, hard copy at the beginning of class on the specified date unless otherwise indicated. You must contact the instructor if you must miss a deadline. To receive credit for the course, all assignments must be completed but if excessively late and not prearranged, the candidate may not receive points for the assignment. Points will be deducted if an exam or written assignment is completed or turned in after the deadline.

- Work received within 48 hours after the deadline will receive a 20% point deduction.
- Work received later than 48 hours after the deadline will require a conference with the instructor to receive credit. The instructor will determine the appropriate point deduction on a case by case basis usually resulting in a 50% reduction in points.
Elementary Education Grading Scale: (Percents)

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>95-100</td>
</tr>
<tr>
<td>A-</td>
<td>92-94</td>
</tr>
<tr>
<td>B+</td>
<td>89-91</td>
</tr>
<tr>
<td>B</td>
<td>86-88</td>
</tr>
<tr>
<td>B-</td>
<td>83-85</td>
</tr>
<tr>
<td>C+</td>
<td>80-82</td>
</tr>
<tr>
<td>C</td>
<td>77-79</td>
</tr>
</tbody>
</table>

Class Points

<table>
<thead>
<tr>
<th>Earned</th>
<th>Possible</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td></td>
<td>Experience 1: Interviews</td>
</tr>
<tr>
<td>30</td>
<td></td>
<td>Experience 2: Observations</td>
</tr>
<tr>
<td>30</td>
<td></td>
<td>Experience 3: Problem Solving</td>
</tr>
<tr>
<td>80</td>
<td></td>
<td>Lesson Plan</td>
</tr>
<tr>
<td>50</td>
<td></td>
<td>Final Learning Reflection</td>
</tr>
<tr>
<td>36</td>
<td></td>
<td>Case Exam #1</td>
</tr>
<tr>
<td>34</td>
<td></td>
<td>Case Exam #2</td>
</tr>
<tr>
<td>50</td>
<td></td>
<td>Case Exam #3 (Includes 16 point take-home question)</td>
</tr>
<tr>
<td>340</td>
<td></td>
<td>TOTAL POINTS</td>
</tr>
</tbody>
</table>

Case Exams will cover reading assignments, class discussions, and activities. Case Exams must be taken during scheduled class times and will follow PLT format (1 case history with 3 short essay questions).

VI. Accommodations Policy

Emporia State University will make reasonable accommodations for persons with documented disabilities. Candidates 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 candidates, the Office of Disability Services, and the professor will be strictly confidential. To reach the office, contact 242 SE Morse Hall, 620-34-6637 (Voice), 620-341-6646 (TTY), or via e-mail disabser@emporia.edu.
**Tentative Course Calendar**
Schedule may be modified if necessary to meet the needs of the students enrolled in the course.

<table>
<thead>
<tr>
<th>Session Date</th>
<th>Read BEFORE Class</th>
<th>Content</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/13</td>
<td>Chapters 1, 3</td>
<td>Intro Teaching Math How students learn math Standards</td>
<td></td>
</tr>
<tr>
<td>1/20</td>
<td>Chapter 3</td>
<td>Assessment in Math Lesson Planning in Math Manipulatives</td>
<td></td>
</tr>
<tr>
<td>1/27</td>
<td>Chapter 5</td>
<td>Problem Solving</td>
<td></td>
</tr>
<tr>
<td>2/3</td>
<td>Chapters 6,7,8</td>
<td>Case Exam Number Sense</td>
<td>● Field Experience #1 ● Case Exam #1</td>
</tr>
<tr>
<td>2/10</td>
<td>Chapters 9</td>
<td>Operations with Whole Numbers</td>
<td>● Field Experience #2 ● Lesson Plan Draft (for peer editing in class)</td>
</tr>
<tr>
<td>2/17</td>
<td>Chapters 10 and 11</td>
<td>Fractions, Decimals, Percent, Ratio, Proportion and Rate</td>
<td>● Revised Lesson Plan Draft (to turn into instructor for feedback) ● Case Exam #2</td>
</tr>
<tr>
<td>2/24</td>
<td>Chapters 12 and 13</td>
<td>Geometry &amp; Measurement</td>
<td></td>
</tr>
<tr>
<td>3/3</td>
<td>Chapter 14</td>
<td>Algebraic Thinking</td>
<td></td>
</tr>
<tr>
<td>3/10</td>
<td>No class—PDS Conference</td>
<td>Work on lesson plan final draft and final reflection assignment</td>
<td>● Field Experience #3 ● Final Draft of Lesson Plan</td>
</tr>
<tr>
<td>3/17</td>
<td>Chapter 15</td>
<td>Data Analysis &amp; Probability</td>
<td></td>
</tr>
<tr>
<td>3/24</td>
<td>Spring Break</td>
<td>Math Activities, Games, and Centers</td>
<td>● Reflection Assignment ● Case Exam #3</td>
</tr>
<tr>
<td>3/31</td>
<td></td>
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</tbody>
</table>

Lesson Plan deadline summary:

- **Rough draft** for peer editing process due 2/17 at beginning of class
- **Revised Rough Draft** due 2/24 at beginning of class
- **Final draft** due 3/17 at beginning of class
- **Lesson plan reflection and mentor evaluation of lesson** must be submitted in hard copy to the instructor by 5PM on April 15th.