



## AEDL A431 Teaching Mathematics in the Elementary School Spring 2009

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	<b>Office Hours:</b> As posted & by appointment

**Mission Statement:** *The USCA School of education, in partnership with the university community, regional schools, area professionals and businesses, prepares dynamic educators who are knowledgeable in their fields, skilled in the art and science of teaching, and dedicated to providing the quality education that every student deserves.*

### I. Descriptive Information

- A. AEDL 431. Teaching Mathematics in the Elementary School
- B. Catalog Description. (Prereq: AMTH 221 and 222 with C or better or consent of instructor and admission to Education Professional Program or special permission of School Head; coreq: AEDL 431P, Senior Block.) Materials and programs for teaching mathematics in the elementary school.
- C. Intended Audience: This course is intended for elementary education majors.

### II. Course Goals and Objectives

#### A. General Goals

Candidates will develop an understanding of teaching mathematics in grades two through eight with a variety of methods and materials that support and enrich the skills, abilities, and attitudes for learning mathematics in the elementary and middle school grades. The course is designed to model exemplary teaching practices and to develop knowledge of and ability to implement teaching strategies as described in the NCTM *Principles and Standards for School Mathematics* and the *South Carolina Mathematics Curriculum Standards*.

- 1. To identify, discuss, and explain the state and national objectives relative to the mathematics curriculum;
- 2. To develop and review effective teaching strategies;
- 3. To develop lesson plans that align state math standards, objectives, appropriate teaching procedures and activities and assessments;
- 4. To develop classroom strategies that will promote diversity of cognitive development levels, learning styles, and positive math attitudes of children in math instruction;
- 5. To provide experience in instructional activities for elementary and middle school mathematics classes;
- 6. To develop personally and professionally as a teacher of mathematics in elementary and middle grades; and
- 7. To provide experience in oral and written communication about concepts in the elementary mathematics curriculum.

#### B. Instructional Objectives

The objectives of this course are designed to facilitate the candidates' development as Dynamic Educators. This course will focus specifically on the Dynamic Educator as planner, instructor, communicator, and professional.

The candidates will be able to:

- 1. Discuss the development of mathematics curricula.
- 2. Communicate, analyze, interpret, organize and evaluate the relevance of mathematics in everyday life.

3. Value mathematics through the study of the cultural, historical and scientific applications of mathematics.
4. Communicate mathematically through reading, writing, listening and discussing ideas.
5. Gain experience in the use technology for teaching mathematics in the classroom.
6. Develop teaching aids for mathematics instruction.
7. Develop a standards-based instructional unit, which integrates with the assigned math practicum's grade level curriculum.
8. Compare and contrast instructional strategies in mathematics lessons.
9. Develop activity-based mathematics lesson plans using a given model lesson format.
10. Demonstrate positive and confident attitudes necessary for effective mathematics instruction.
11. Diagnose students' mathematical deficiencies and determine remediation actions.
12. Become active in professional organizations or activities designed to enhance mathematics.
13. Plan and participate in standards-based instructional activities with manipulative materials, children's literature, and technology.

### III. Course Readings:

#### A. Required Texts

Van De Walle, John. (2006). *Elementary and Middle School Mathematics Teaching Developmentally; 6th ed.* Boston: Pearson Education, Inc. ISBN: 0-205-48392-5

"Quick Flip Questions for the Revised Bloom's Taxonomy", ISBN 978-1-56472-729-9

South Carolina Mathematics Curriculum Standards 2007. [On-line] Available:

<http://ed.sc.gov/agency/offices/cso/standards/math/documents/2007MathematicsStandards.doc>

Two-inch, 3-Ring Binder with sections labeled for Curriculum Standards, Journal, Class Notes, Research Articles, My Lessons, and Observation Log

#### B. Optional Texts

None

#### C. Supplemental Readings

Other readings will be provided in class for group discussion and related assignments.

### IV. Instructional Procedures

Teaching strategies used to address course content include, but are not limited to: hands-on activities demonstrating the use of manipulatives in instruction; video presentations of assessment procedures and classroom practices with children, cooperative learning projects, use of overhead demonstrations, investigations with the inquiry process, guest speakers, field experiences, questioning, discussion and textbook demonstrations and simulations.

### V. Course Requirements

#### A. **Administrative Requirements**

##### 1. Honor Code:

The following statement is to be included on the first page of every major assignment:

*On my honor as a University of South Carolina Aiken student, I have completed my work according to the principle of Academic Integrity. I have neither given nor received any unauthorized aid on the assignment/examination.*

Signature \_\_\_\_\_ Date \_\_\_\_\_

##### 2. USCA Code of Conduct: Candidates will conduct themselves in class in accordance with the standards noted in the USCA Student Handbook. Given that this course is required in preparation for becoming a teacher, candidates should exhibit those behaviors expected of professionals.

- ❖ Cell phones and pagers should be on a non-audio mode during class.
- ❖ Please do not bring children or guests to class unless the professor has given prior permission.
- ❖ Do not submit full or partial assignments from other classes for requirements in this course.

##### 3. Students with Disabilities: If you have a physical, psychological, and/or learning disability which might affect your performance in this class, please contact the Office of Disability Services, 126A BSED, (803) 641-3609, as soon as possible. The Disability Services Office will determine appropriate accommodations based on medical documentation.

4. **Class Participation/Attendance Policy:** As a part of your professional development, class attendance is essential and punctuality is expected. You are responsible for material covered in class during any absence and for checking with classmates about any changes in scheduling or assignments that may have been made. If you anticipate an absence, notify the instructor in advance of the absence.
5. **Late Assignments:** All assignments are expected by the class meeting time on due dates. If you will be absent the day an assignment is due, make arrangements to turn it in on time.
6. **Student Email:** Announcements and assignments will be sent through the USCA email system on a regular basis. It is important that candidates check their USCA email account on a daily basis and send any assignments for class through this account. You should contact CSD (<http://www.usca.edu/helpdesk/studentemail>) for information on setting up and using your account.

## **B. Required Activities**

### ***Daily Assignments/Participation (15%)***

- Participate in classroom discussions, assignments, and small-group tasks.
- Maintain a 2-inch, 3-ring binder with sections labeled for **Curriculum Standards, Journal, Class Notes, Research Articles, My Lessons, and Observation Log**. (Notebooks will be graded for completeness on the midterm exam date.)
- Complete all class and homework assignments.
- Journal: Writing about mathematics and its teaching leads to better understanding of concepts. Each week, respond in paragraph format (of no more than one page) to a specific question posed. Each journal entry should be included in the course binder.

### ***Professional Article Reflections (10%)***

Write two 1-page position papers based on professional articles on 1) a current mathematics education issue and 2) mathematics research. Each paper should include an article summary and a personal reflection stating your position on the topic. Include the APA citation for your article at the top of the first page of your reflection. Attach the first three pages of the article.

- Read, summarize and reflect on one *instructional-based* article.
- Read, summarize and reflect on one *research-based* article.

### ***Performance Task Project (20%)***

Prepare and facilitate a performance task with a pair of students (in grades 2 – 8). After completing the task with the students, reflect on your role as the teacher, the student's role, misconceptions, and current research. Write a paper describing the performance task, your role, and how the students were involved. Describe the prior knowledge necessary for the students to complete the task. Explain how you determined whether or not the students understood the process of the task. Describe the misconceptions/errors you had to clarify. Analyze the student work produced. Attach the student work with your paper.

### ***Instructional Unit/Presentation (35%)***

Prepare one detailed lesson plan (for the grade level of the assigned mathematics practicum) for each of the 5 Content Standards of the *Principles and Standards for School Mathematics*. The 5 Process Standards must be included within each of these lesson plans. Lesson plans will be in the 6-E's format and will include activities that are aligned with the current SC Curriculum Mathematics Standards and incorporate hands-on student involvement. Transform lessons from your mathematics textbook or other resource into innovative standards-based lessons. Present one the lessons to the class for peer review and reflection. Construct one formal assessment and scoring guide to determine mastery of one of the lessons.

### ***Exams (20%)***

Demonstrate understanding and application of the course on mid-term and final examinations based on class and text information. Exams may include both mathematical content and instructional methods.

**Assignment Criteria:** Major assignments (journals and observation logs excluded) should be completed using a word processor, making use of spell check and grammatical proofing. Fonts used must be of block type and 12 pt. size.

## VI. Evaluation and Grading Scale

**Grading:** Grading in this course will be determined, in part, by the critical reading and writing activities regarding the course materials and contribution to class and group activities. Evaluation will focus on the ability to identify important ideas, articulate the complexity of issues, recognize different points of view, and apply content in meaningful ways. This includes all information from media used in class, such as handouts, films, video and audiotapes, as well as presentations and discussions. Grades will be determined through a variety of written and non-written activities as stated.

<b>Evaluation:</b>		<b>Grading Scale</b>	
Daily Assignments/Participation	15 %	93 - 100%	A
Professional Articles	10 %	90 - 92%	B+
Performance Task Project	20 %	87 - 89%	B
Instructional Unit /Presentation	35%	82 - 86%	C+
Exams	20%	78 - 81%	C
		74 - 77%	D+
		70 - 73%	D
		Below 70	F

### ADEPT Performance Standards

#### Domain 1: Planning

- APS 1 Long Range Planning
- APS 2 Short-range Planning of Instruction
- APS 3 Planning Assessments and Using Data

#### Domain 2: Instruction

- APS 4 Establishing & Maintaining High Expectations for Learners
- APS 5 Using Instructional Strategies to Facilitate Learning
- APS 6 Providing Content for Learners
- APS 7 Monitoring, Assessing, & Enhancing Learning

#### Domain 3: Classroom Environment

- APS 8 Maintaining an Environment that Promotes Learning
- APS 9 Managing the Classroom

#### Domain 4: Professionalism

- APS 10 Fulfilling Professional Responsibilities

## VII. Bibliography of Selected Readings

### A. Selected Articles and Books

National Council of Teachers of Mathematics (2000). *Principles and Standards for School Mathematics*. Reston, VA: NCTM.

Selected articles from professional journals, including *Educational Leadership*, *The Mathematics Teacher*, *Teaching Mathematics in the Middle School*, and *Teaching Children Mathematics*.

### B. Internet Web Pages

SC State Department of Education: <http://ed.sc.gov/>

South Carolina Council of Teachers of Mathematics: <http://www.scctm.org>

National Council of Teachers of Mathematics: <http://www.nctm.org>

## IX. Tentative Topics and Class Activities/Assignments

The following assignments and activities will be used in evaluating your level of achievement in this course. The instructor reserves the right to change and/or delete assignments. Major assignments should be typed unless other specified.

### AEDL 431 Class Schedule

Date	Topic	Readings / Assignment
January 15	<ul style="list-style-type: none"> <li>Course Overview / School Tour</li> <li>Venn Diagrams</li> <li>Mathematics Education Foundations</li> <li>National and State Standards</li> <li>NCTM Principles and Standards</li> <li>Educational Research Articles</li> <li>Numbers and Operations: <i>Base Ten Blocks</i></li> </ul>	Read Chapter 1 Complete Professional Article Refl. #1 Access SC Math Standards 2007 <i>Journal Entry #1: Math Autobiography</i> <i>(Reflect on your prior mathematics education / experiences.)</i>
January 22	<ul style="list-style-type: none"> <li>Content &amp; Process Standards</li> <li>NCTM Principles</li> <li>Lesson Planning with the 6-E's Format</li> <li>Instructional Unit / Presentation Assignment</li> <li><i>Weight Watchers</i>: Performance Task with Students</li> </ul>	<b>Article #1 Instructional-based Due</b> Read Chapters 2 – 4, Do p. 34 #5 <i>Journal: Reflection on small group Performance Task</i>
January 29	<ul style="list-style-type: none"> <li>Using Children's Literature</li> <li>Algebra <i>Patterns and Tiles</i></li> <li>Numbers and Operations <i>Roman Numerals</i></li> <li><b>Lesson Presentations (1 - 2)</b></li> </ul>	<b>Article #2 Research-based Due</b> Read Chapter 15 (pp. 259 – 280) Read Chapters 9, 12 & 13 <i>Journal: Problem Solving Approach – Pros and Cons (p. 59 #2)</i>
February 5	<ul style="list-style-type: none"> <li><b>Lesson Presentations (3 - 6)</b></li> <li>Measurement : <i>Angles, Length, Mass, Capacity</i></li> </ul>	Read Chapters 6 & 20 <i>Journal: Reflection on peer review lessons</i>
February 12	<ul style="list-style-type: none"> <li><i>All-Day Observations</i></li> </ul>	
February 19	<ul style="list-style-type: none"> <li><b>Lesson Presentations (7 - 10)</b></li> <li>Algebra with Algebra Tiles</li> <li>Technology in Mathematics Education <i>Hiker Lesson</i></li> </ul>	Read Chapter 8 Read Chapter 15 (pp. 280 – 292) Complete Journal Article Refl. #2 <i>Journal: Use of Calculators</i>
February 26	<ul style="list-style-type: none"> <li><b>Lesson Presentations (11 - 15)</b></li> <li>Assessment</li> <li>Cooperative Group Problem-Solving</li> <li>Planning a Performance Task</li> </ul>	Read Chapter 5 & 6 <i>Journal: Teacher-centered instruction vs. student-centered instruction</i>
March 5	<b>Mid-term Exam</b>	<b>Exam and Notebook Check</b> <i>(Lesson Analysis #1 for Practicum due Friday, March 6)</i>
March 12	USCA Spring Break	
March 19	<ul style="list-style-type: none"> <li>Geometry</li> <li>Geometer's Sketchpad</li> </ul>	Read Chapter 21 <i>Journal: Manipulatives – Pros and Cons</i>
March 26	<ul style="list-style-type: none"> <li>Fractions <i>Pattern Blocks, Fraction Strips</i></li> <li>Decimal and Percent Concepts</li> </ul>	Read Chapters 16 – 18 <i>Journal: p. 314 #1</i>
April 2	<ul style="list-style-type: none"> <li>Measurement</li> </ul>	Read Chapter 20 <i>Journal: How will you make instruction of measurement relevant to students' lives?</i>
April 9	<ul style="list-style-type: none"> <li>Website Evaluations</li> <li>Unit Plan Work</li> </ul>	<b>Performance Task Due</b>
April 16	<ul style="list-style-type: none"> <li>Data Analysis</li> <li>Probability</li> </ul>	Read Chapters 22 & 23 <i>Journal: Grading Policy for Math</i>
April 23	<ul style="list-style-type: none"> <li>Geometry: <i>Tangrams</i></li> <li><i>Math Curse</i> (Math Literature)</li> <li>Math Education Discourse</li> <li>Course Evaluation</li> </ul>	<b>Instructional Unit Due</b> Read Chapters 10, 11, 13-14 <i>Journal: What influence do mathematics professional organizations have on teaching and learning?</i>
April 30		<b>Final Examination due by Noon</b> (Journal Abstract & Future Teacher Essay) <i>Lesson 2 Analysis and Practicum Documentation Due</i>

*The above dates and topics are TENTATIVE and may be changed by the instructor, if necessary.*