

<b>Auburn University</b> <b>Course Syllabus</b>
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**Instructor: Dr. Marilyn E Strutchens**  
**Email for appoints: strutme@auburn.edu**  
**5:00 pm – 8:00 pm, Tuesdays, Haley Center 2456,**  
**Fall 2010**

1. **Course Number:** CTSE 7510  
**Course Title:** Research in Secondary Mathematics Education  
**Credit Hours:** 3 Semester Hours  
**Prerequisites/Corequisites:** None
  
2. **Date Syllabus Prepared:** January 11, 2007, June 22, 2009, August 22, 2010
  
3. **Texts or Major Resources:**

Arbaugh, F., Herbel-Eisenmann, B., Ramirez, N., Knuth, E., Kranendonk, H., & Quander, J. R. (2010). Research & practice: The NCTM Research Agenda Conference report. Reston, VA: National Council of Teachers of Mathematics.

Sowder, J., & Schappelle, B. (Eds.)(2002). *Lessons learned from research*. Reston, VA: National Council of Teachers of Mathematics. (Abbreviation LLR)

Carpenter, T. P., Dossey, J. A., & Koehler, J. L. (Eds.) (2004). *Classics in mathematics education research*. Reston, VA: National Council of Teachers of Mathematics. (Abbreviation CMER)

Kilpatrick, J., Martin, W. G., & Shifter, D. (Eds.) (2003) *A research companion to principles and standards for school mathematics*. Reston, VA: National Council of Teachers of Mathematics. (Abbreviation RCPSSM)

Lester, F. K. Jr. (Ed.) (2007). *Second handbook of research on mathematics teaching and learning*. Reston, VA: National Council of Teachers of Mathematics and Information Age Publishing.

Mewborn, D. (Series Ed.), Langrall, C. W. (Vol. Ed.). (2006). *Teachers engaged in research: Inquiry in mathematics classrooms, grades 3-5*. Greenwich, CT: Information Age Publishing.

Mewborn, D. (Series Ed.), Masingila, J. O. (Vol. Ed.). (2006). *Teachers engaged in research: Inquiry in mathematics classrooms, grades 6-8*. Greenwich, CT: Information Age Publishing.

Mewborn, D. (Series Ed.), Smith, S. Z., & Smith, M. E. (Vol. Eds.). (2006). *Teachers engaged in research: Inquiry in mathematics classrooms, grades pre-K-2*. Greenwich, CT: Information Age Publishing.

Mewborn, D. (Series Ed.), Van Zoest, L. R. (Vol. Ed.). (2006). *Teachers engaged in research: Inquiry in mathematics classrooms, grades 9-12*. Greenwich, CT: Information Age Publishing.

[Recommended Background] National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics*. Reston, VA: NCTM. (available online at <http://standards.nctm.org>)

[Recommended Background] American Psychological Association. (2001) *Publication manual of the American Psychological Association* (5th ed.). Washington, DC: Author.

Other readings as assigned.
  
4. **Course Description:** Review, analyze, and interpret available research in mathematics education with emphasis on the application of research in the mathematics classroom. (AU Bulletin)
  
5. **Course Objectives:** The goals of this course are to prepare mathematics educators who:
  - Understand the proper role of research in furthering the field of mathematics education, including an awareness of critical trends and issues in mathematics education research.
  - Have a familiarity of current areas of mathematics education research and the general research strategies employed.

- Can read and analyze mathematics education research articles and studies and see their applicability to classroom practice, including producing literature reviews on particular topics.
- Are able to identify potential research questions in mathematics education and to identify potential research strategies that might answer those questions.
- Have knowledge of research relating collective responsibility for student learning to increased achievement for all students. **AQTS(5)(c)4.(i)**
- Have knowledge of the principles of individual and organizational change and a commitment to assume personal responsibility for leading and supporting others in results-oriented changes. **AQTS(5)(c)4.(ii)**
- Have knowledge of the impact native language and linguistic background on language acquisition. **AQTS (3)(c) 1.(ii)**
- Have knowledge of the process of second language acquisition and strategies to support the learning of students whose first language is not English. **AQTS (4)(c)2.(i)**

## 6. Course Content and Schedule:

<b>Dates</b>	<b>Topic</b>	<b>Readings</b>	<b>Due</b>
<b>8/24/10</b>	Introductions, Overview of the Course, What is research in mathematics education? What are the major research issues in mathematics education today? Linking Research to Practice; Syllabus	<ol style="list-style-type: none"> <li>1. Hiebert Articles related to Relationships Between Research and the NCTM Standards <ul style="list-style-type: none"> <li>• Journal for Research in Mathematics Education</li> <li>• Research Brief</li> <li>• Mathematics Teaching in the Middle School</li> </ul> </li> <li>2. Research &amp; Practice: The NCTM Research Agenda Conference report</li> </ol>	
<b>08/31/10</b>	No Class	Reading Day	
<b>09/07/10</b>	Action Research	Read: S. Sexton. (2010). Putting it all together: Action research in teaching practice. <i>Waikato Journal of Education</i> , 15,135 -144. <b>(Reflection)</b> 9-12 – Read Robinson’s Chapter 6-8 – Read French’s and Nathan’s Chapter 3-5 – Read Adams’ and Sharp’s Chapter K-2 – Read Schweitzer’s Chapter	<b>Reflection is due.</b>
<b>9/14/10</b>	Philosophies, Theories, & Methods	<ul style="list-style-type: none"> <li>• Simon, M. (2009). Amidst Multiple Theories of Learning in Mathematics Education. <i>Journal for Research in Mathematics Education</i>, 40, 477-490. Retrieved from Academic Search Premier database. <b>(Reflection)</b></li> <li>• LLR (pp. 1-4; 45-70) <b>(Reflection)</b> <ul style="list-style-type: none"> <li>○ What Can Teachers Learn from the Research?</li> <li>○ Reading Research Reports</li> </ul> </li> </ul>	<b>2 Reflections are due.</b>

9/21/10	Perspectives on Student Learning	<ul style="list-style-type: none"> <li>Brownell (CMER, Chapt. 1)</li> <li>Erlwanger (CMER, Chapt. 5)</li> <li>Tall &amp; Vinner (CMER, Chapt. 9)</li> </ul>	<b>Reflection is due.</b>
9/28/10	Research Related to Learning <i>Developing a Review of Literature</i>	<ul style="list-style-type: none"> <li>Lampert (CMER, Chapt. 11)</li> <li>LLR, Section II</li> </ul>	<ul style="list-style-type: none"> <li><b>Reflection is due.</b></li> <li><b>Statement of Research Interest is due</b></li> </ul>
10/05/10	Research Related to Curriculum	<ul style="list-style-type: none"> <li>Stein, Remillard, &amp; Smith (Chapter 8, SHRMTL) <b>(Reflection)</b></li> </ul>	<b>Reflection is due.</b>
10/12/10	<p><b>Presentations</b> Present an overview of research in the particular content area based on the relevant chapters from <i>A Research Companion</i>, the other course texts, and at least one original research article. Available topics:</p> <ul style="list-style-type: none"> <li>Number (RCPSSM, Chapters 6-8; CMER, Chapt. 8) _____</li> <li>Algebra (RCPSSM, Chapters 9-10; LLR, Chapt. 13) _____</li> <li>Geometry and Measurement (RCPSSM, Chapters 11-12; CMER, Chapt. 6)</li> </ul>		
10/19/10	<ul style="list-style-type: none"> <li>Data Analysis and Probability (RCPSSM, Chapters 13-14; LLR, Chapt. 14) _____</li> <li>Reasoning and Proof (RCPSSM, Chapter 15) _____</li> <li>Communication (RCPSSM, Chapter 16) _____</li> <li>Representation (RCPSSM, Chapter 19) _____</li> </ul>		
10/26/10	Research Related to Assessment	LLR, Section IV	<b>Reflection is due.</b>
11/02/10	Research Related to Affect and Individual/Organizational Change	<ul style="list-style-type: none"> <li>Schoenfeld (CMER, Chapt. 10)</li> <li>Thompson (CMER, Chapt. 13)</li> <li>Fenema &amp; Sherman (CMER, Ch. 3)</li> <li>Zan, R., Brown, L., Evans, J. &amp; Hannula, M. S. (2006). Affect in mathematics education: An introduction. <i>Educational Studies in Mathematics</i>, 63, 113–121. DOI: 10.1007/s10649-006-9028-2.</li> </ul>	<b>Reflection is due.</b>
11/16/10	Research Related to Culture and Diversity, including English Language Learners Research	<ul style="list-style-type: none"> <li>DIME (Chapter 10, SHRMTL) <b>(Reflection)</b></li> <li>Khisty &amp; Chval Article <b>(Summary Article)</b></li> </ul>	<b>Reflection is due. Summary for Teachers is due.</b>
11/22-26/10	Thanksgiving Break		
11/30/10	Research Related to Policy Development (Last day of class)	Tate & Rousseau (Chapter 28, SHRMTL) <b>(Reflection)</b>	<ul style="list-style-type: none"> <li><b>Research Project is due.</b></li> <li><b>Reflection is due.</b></li> </ul>
12/07/10	Final Exam		<b>Final Exam</b>

7. **Course Requirements/Evaluation:** In meeting the goals of this class, students shall complete the following:

- Class participation. Students are expected to complete all assigned readings, including preparing notes and answering discussion questions prior to class meetings. They are also expected to attend and participate in class meetings.
- Chapter and article reflections. Prior to each class meeting, students will be required to write a reflection related to a specific article or chapter that they read for homework. Below are questions that should be answered:

- For each article or chapter with reflection in bold proceeding it students will write a three-page reflection. Students will use the APA Manual of Style as a reference as to how to reference the articles. Below is the information that students should include in the summary.
  - 1) Discuss the major points of the article or chapter.
    - (i) Important terms
    - (ii) Theoretical basis if there is one
    - (iii) Methodology used.
    - (iv) Major implications for mathematics education
    - (v) How it relates to other assigned readings.
  - 2) How will the article impact your instructional strategies and interactions with students, teachers, parents, and administrators in general?
  - 3) Reference information

**Note: For synthesis of research type article or chapter provide a brief statement about the major studies or theories presented.**

- Statement Related to Action Research Interest and Research Question. The focus of this research is to study a particular teaching strategy or move, such as orchestrating discourse in a mathematics classroom, creating an inquiry based environment, using cooperative learning groups, teaching via problem solving, or differentiating instruction. This is a 2-3 page statement about students' action research interest. Students will discuss briefly some area of teaching that they are interested in studying, and tell why they would like to examine more closely how they are carrying out a particular teaching move or strategy in their classroom and why? Students will also discuss the major question related to their research interest.
- Major Paper. Students will complete one formal action research paper (10 -12 pages).
  - Identify an area of interest related to mathematics teaching and learning for action research,
  - Prepare a review of literature relevant to that area, including at least 12 research articles,
  - Develop a plan for investigating the phenomena in your classroom,
  - Conduct the research, collect data, and analyze the data, and
  - Discuss the results and implications for your classroom
  - Students will also be asked to make a short presentation of their project to the class.
- Chapter Discussant. During the semester students will work in pairs to lead one class discussion. They will present an overview of research in a particular content area or theory based on the relevant chapters from *A Research Companion*, the other course texts, and at least one original research article. Their presentation should be interactive and engage members of the class. Each pair will be responsible for handouts and any other materials needed to lead the discussion. Participants should make copies of power point presentations and ensure that all of the materials for use are readable from the document camera.
- Summary of a Research Article for Teachers. Students will write a summary of a relevant research article for teachers. This summary will be written for a practitioner journal. It will be patterned after the "On My Mind: What Can We Expect from Research?" article by James Hiebert.
- Final exam. An opportunity to reflect over the course and make connections across areas of discussion.

## **Evaluation**

### Course Requirements and Assignments

<u>Assignment</u>	<u>Points</u>
1. Chapter and Article Reflections (10 points each)	100
2. Brief Statement of Research Interest/Action Research	50
3. Major Paper	100
4. Chapter Discussant	50

5. Summary of a Research Article for Teachers	50
6. <u>Final Exam</u>	<u>100</u>
Total	450

Final course grades will be assigned based on the percentage of possible points earned by students.

A	90% or above
B	80 % - 89%
C	70% - 79%
D	0% - 69%

**Grading:**

- **IMPORTANT NOTE:** All written assignments should reflect professional standards of communication, including correct grammar and spelling. They should be typewritten and should follow the style put forward in the APA Publication Manual.

**8. Class Policy Statements:**

Attendance/Absences: Attendance at scheduled class meetings is required. Unexcused absences will result in a lowering of your course grade.

Unannounced quizzes: There will be no unannounced quizzes.

Accommodations: Students who need accommodations are asked to arrange a meeting during office hours the first week of classes, or as soon as possible if accommodations are needed immediately. If you have a conflict with my office hours, an alternative time can be arranged. To set up this meeting, please contact me by e-mail. Bring a copy of your Accommodation Memo and an Instructor Verification Form to the meeting. If you do not have an Accommodation Memo but need accommodations, make an appointment with the Program for Students with Disabilities at 1244 Haley Center, 844-2096 (V/TT).

Honesty Code: The University Academic Honesty Code and the *Tiger Cub* Rules and Regulations pertaining to *Cheating* will apply to this class.

Professionalism: As faculty, staff, and students interact in professional settings, they are expected to demonstrate professional behaviors as defined in the College's conceptual framework. These professional commitments or dispositions are listed below:

- Engage in responsible and ethical professional practices
- Contribute to collaborative learning communities
- Demonstrate a commitment to diversity
- Model and nurture intellectual vitality