

**Augusta State University**  
**College of Education**  
**Department of Teacher Education**  
**Spring 2007**

**Course:** EDTD 6241: Best Practices in Mathematics Education  
EDTD 7165: Advanced Topics in Mathematics Education  
**Time:** M: 5:30 - 8:15, UH 353  
**Instructor:** Dr. Emam Hoosain  
**Office:** UH 369  
**Telephone:** 667-4507 (Office); 447-8063 (H); **Email:** ehoosain@aug.edu  
**Office Hours:** T: 2:30 – 5:30; W: 1 – 5; R: 1:00 – 4:30; and by appointment.

**Required Text:**

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

**Other useful Publications:**

1. Brahier, Daniel J. (2005). *Teaching Secondary and Middle School Mathematics* (2<sup>nd</sup> ed.). Boston: Pearson Education, Inc.
2. Bennett, Jr., Albert B. & Nelson, L. Ted. (2004). *Mathematics for Elementary Teachers: An Activity Approach* (6<sup>th</sup> ed.). Boston: McGraw Hill.
3. Cangelosi, James S. (2003). *Teaching Mathematics in Secondary and Middle School: An Interactive Approach* (3<sup>rd</sup> ed.). NJ: Merrill Prentice Hall.
4. Cathcart, W. G., Yvonne M. Pothier, James H. Vance, & Nadine S. Bezuk. (2000). *Learning Mathematics in Elementary and Middle Schools* (3<sup>rd</sup> ed.). NJ: Merrill Prentice Hall.
5. Cooney, Thomas J., Stephen I. Brown, John A. Dossey, Georg Schrage, & Erich Ch. Wittman. (1996). *Mathematics, Pedagogy, and Secondary Teacher Education*. NH: Heinemann.
6. Grouws, D. A. (Ed.). (1992). *Handbook of Research in Mathematics Teaching and Learning*. NY: Macmillan Publishing Co.
7. Hatfield, Mary M., Nancy T. Edwards, Gary G. Bitter, & Jean Morrow. (2000). *Mathematics Methods for Elementary and Middle School Teachers*. NY: John Wiley and Sons, Inc.
8. Hoosain, Emam. (2003). *A Concrete Problem-Solving Approach to the Teaching of Operations on Fractions Using Discrete Manipulative Materials*. AZ: Scholargy, Inc.
9. Huetinck, L. & Munshin, S. N. (2000). *Teaching Mathematics for the Twenty First Century*. Merrill.
10. Kennedy, Leonard M. & Tipps, Steve. (2000). *Guiding Children's Learning of Mathematics* (9<sup>th</sup> ed.). CA: Wadsworth Thomson Learning.
11. National Council of Teachers of Mathematics. (1989). *Curriculum and Evaluation Standards for School Mathematics*. Reston, VA: NCTM.
12. National Council of Teachers of Mathematics. (1991). *Professional Standards for Teaching Mathematics*. Reston, VA: NCTM.

13. National Council of Teachers of Mathematics. (1995). *Assessment Standards for School Mathematics*. Reston, VA: NCTM.
14. Reys, Robert E., Mary M. Lindquist, Diana V. Lambdin, Nancy L. Smith, Marilyn N. Suydam, Margaret Niess, Dianne Erickson, & Karen Higgins. (2004). *Helping Children Learn Mathematics* (7<sup>th</sup> ed.). NY: John Wiley & Sons, Inc.
15. Rubenstein, Rheta N., Charlene E. Beckmann, and Denisse R. Thompson. (2004). *Teaching and Learning Middle Grades Mathematics*. CA: Key College Publishing.
16. Senk, S. L. & Thompson, D. R. (Eds.). (2003). *Standards-Based School Mathematics Curricula: What Are They? What Do Students Learn?* NJ: Lawrence Erlbaum Associates.
17. Sharp, Janet M. & Hoiberg, Karen B. (2005). *Learning and Teaching K – 8 Mathematics*. NY: Pearson Education, Inc.
18. Sheffield, Linda J. & Cruikshank, Douglas E. (2000). *Teaching and Learning Elementary and Middle School Mathematics* (4<sup>th</sup> ed.). NY: John Wiley and Sons.
19. Troutman, Andria P. & Lichtenberg, Betty K. (1995). *Mathematics: A Good Beginning* (5<sup>th</sup> ed.). NY: Brooks/Cole Publishing Company.
20. Van De Walle, John A. (2007). *Elementary and Middle School Mathematics* (6<sup>th</sup> ed.). NY: Addison Wesley Longman, Inc.

Supplementary Readings will be assigned from time to time.

## Syllabus

### Course Description:

The course examines best practices in mathematics education and theory and research which support such practices. These best practices are drawn from the literature and actual classroom practice. *Prerequisites:* Admission to Graduate Program and EDTD 6010.

### Course Goal:

To provide:

- (a) a theoretical framework for professional practice;
- (b) opportunities for students to critique research in mathematics education;
- (c) a context for students to experiment with ideas for the teaching of mathematics;
- (d) opportunities for students to discuss controversial issues in mathematics education;

### Specific Objectives:

1. The students will demonstrate knowledge of:
  - (a) NCTM's Principles and Standards; and Georgia Performance Standards (GPS).
  - (b) recent results of research in mathematics education;
2. They will:
  - (a) critique research articles and reports;
  - (b) discuss some big ideas in the teaching of mathematics;
  - (c) use a teaching strategy and report on its effectiveness;
  - (d) orally present findings from their readings and investigation;

(e) assess student achievement  
within the context of NCTM's recommendations and the GPS.

**National Board Standards Addressed:**

1. Educators are committed to students and their learning.
2. Educators know the subjects they teach and how to teach those subjects to students.
3. Educators are responsible for managing and monitoring student learning.
4. Educators think systematically about their practice and learn from experience.
5. Educators are members of learning communities.

**Course Outline:**

Tentative Schedule

1. Introductions and Overview of Course
2. An overview of the NCTM Principles and Standards
3. TIMSS and NAEP
4. Big Ideas in the Teaching of Mathematics; e.g., Induction
5. Approaches to Teaching Mathematics
6. Cognitively Guided Instruction (CGI) and Problem Solving
7. The Place of Standard Algorithms in the Classroom
8. Teaching mathematics through problem solving in the context of NCTM's content and process standards and the GPS
9. The van Hiele Model for Geometry
10. Resources for the teaching of mathematics; e.g., Technology (GSP)
11. Monitoring student progress and evaluating achievement
12. Error pattern analysis
13. Oral presentations by students (Ongoing)
14. Students' Input (Ongoing)

**Evaluation**

**Course Grading Procedure:**

<b>1. Class Participation and Attendance</b>	<b>20 pts.</b>
<b>2. Applications</b>	<b>230 pts.</b>
Article summary and presentation (A sign-up sheet will be available.) [Presentation: 10 pts.; Summary: 20 pts.]	30 pts.
*Project Report and Presentation (Due 11/13) [Report: 60 pts.; Presentation: 20 pts.]	80 pts.
Impromptu Assignments and Quizzes	60 pts.
Report and Presentation on Standards-Based Curriculum (Group Work) (Due 11/20) [Presentation: 20 pts.; Report: 40 pts.]	60 pts.

**Note:** All dates are tentative. More specific directions about these assignments will be given in class.

**Note:** Students are required to attend classes regularly and punctually. If a student is absent for more than **one session**, he/she may be asked to withdraw from the class. Unsatisfactory attendance of classes and participation in class activities will adversely affect your grade. It is the responsibility of the student to complete any work assigned during his/her absence. **Points may be deducted for all late papers - 10% for every day it is late.** Points will be deducted for grammatical and other errors in written assignments. Typed reports must be double-spaced with left and top margins one and a half inches wide (other margins one inch wide), pages numbered (centered) consecutively, and font size being Times 12. A cover page and running head are optional. **No folders, please.** You are advised to complete the readings and assignments, meet regularly with other students to discuss issues, and see the Instructor if you have any problems. There should be no eating or drinking in class (to avoid any temptation, please do not bring [except in your stomach] any food or drink into the classroom); and please turn off your cell phones. Children and other relations are not allowed in class.

Final grading will be as follows:

**A: 90+ - 100**

**B: 80+ - 90**

**C: 70+ - 80**

**D: 60+ - 70**

**F: 00 - 60**

**\*EDTD 6241:** Conduct a research/investigation into the effectiveness of a teaching strategy with one student or a group of students and write a report under the following four headings: a. **Introduction** – state clearly the problem you are addressing and give a justification (its importance, relevance, and significance in current reforms [state and national] in mathematics education); indicate references to the literature; make the rationale very clear; b. **Procedure** – state the purpose of your investigation and describe in **detail** what you did; describe the subject(s) with whom you did this investigation; describe any data collection procedures and state the kind of data you collected (qualitative and quantitative); include lesson plans, etc. c. **Analysis of Data and Findings** – explain how you analyzed the data and state the findings; write a brief conclusion on the basis of your findings; d. **Summary** (summarize what you did), **Conclusion** (state a general conclusion emanating from your analysis), **Discussion** (state the implications of your findings), **Recommendation** (resulting from your findings), and **Self-Reflection** (evaluate the impact that this experience had on you and state any changes you will make if you have to redo it).

**EDTD 7165:** Design and administer a questionnaire/survey to the math teachers in your grade level. Based on the results of the survey, prepare an in-service program of work for these teachers and implement this program. Your report should include the

following: a. **Introduction** – a clear statement of the problem or issue that you are addressing; the importance or significance of this issue or problem; and the relevance of this issue or problem to state and national reforms in mathematics education; make the rationale very clear; b. **Procedure** – state the purpose and specific objectives of the program; state and describe the participants; describe, in detail, the tasks that you gave to the participants and the methods and materials you used to implement the tasks; c. **Evaluation & Analysis**: Explain how you determined the success or otherwise of the program; ask the participants to evaluate you and the program (give them a questionnaire, analyze their responses to the questionnaire, and report the results of the analysis); analyze your own performance as a conductor of an in-service program; summarize the findings from your evaluation and write a brief conclusion based on your findings; d. **Summary** (summarize what you did), **Conclusion** (state a general conclusion emanating from your **Evaluation & Analysis**), **Discussion** (state the implications of your findings), **Recommendation** (resulting from your findings), and **Self-Reflection** (state any difficulties you experienced; evaluate the impact that this experience had on you and state any changes you will make if you have to redo it).

The report should be typed, double-spaced, font size 12 (Times), with margins between 1 inch and one and a half inches wide (Please refer to the second **Note** above). Include the heading for each section in the report. Points will be deducted for grammatical and other errors. **Please do not submit in folders or plastic covers.**

### **Epilogue**

**Note:** There is a degree of flexibility relating to these assignments. In other words, they can be modified to suit special circumstances. When you have an idea what you would like to do, I suggest, very strongly, that you discuss it with me. My dubious comments may help you to refine your thinking about what you have in mind.