

**EMAT 3410–Mathematics Teaching & Curriculum PreK-5**

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Overview: This course will concentrate on geometry, measurement, probability, data analysis, and algebra. We will also work on translating the ideas about children's mathematical thinking from EMAT 3400 to small group and whole class settings.

Objectives: The objectives of this class are for you to:

- Understand how children think about geometry, measurement, data/probability, algebra;
- Strengthen your own mathematics background in the areas of geometry, measurement, data/probability, algebra;
- Learn to make decisions about content selection and modification of instructional activities based on theories of mathematical learning and current educational reform efforts;
- Use knowledge of how children learn mathematics to plan appropriate instruction for small and large groups.
- Develop critical view of mathematics curriculum, textbooks, and other instructional materials
- Develop a repertoire of alternative (differential) instruction and assessment strategies to meet the intellectual and cultural needs of diverse students.
- Examine the nature of schooling, including teaching, grouping, testing, and policy issues, and its impact on the mathematics education of diverse students.

Required Course Materials: We will use the remaining chapters from our text from EMAT 3400 and the Georgia Performance Standards. The copy of the standards that is organized by topic (rather than by grade level) will be more useful in this course.

Attendance: Attendance and participation are essential in this class, both for you to learn and so that others may benefit from your input. Attendance is expected because most of class time will be spent on group discussions and activities. The ideas and concepts presented cannot easily be transmitted through class notes. You are responsible for all announcements made in class even if you are not there. It is important that you arrive promptly. Absences and tardiness will affect your professionalism grade. Any exceptions to attendance and punctuality should be discussed with me *in advance*.

Assignments: I will try to make the purpose of each assignment clear. If you have questions about the purpose of the assignment or what is expected of you, please ask. The requirements for all major assignments are detailed on the following pages. All assignments are due to me (via WebCT) by 5:00 pm on the due date listed in the syllabus. Late assignments will be assessed a penalty of 10% of the grade unless there are extenuating circumstances that are discussed with me *in advance*.

You are expected to demonstrate correct use of the English language with regard to grammar, punctuation, and spelling. I do grade on technical writing skills as well as content. Please proofread your work before turning it in to me. If you have weaknesses in the area of grammar, punctuation, or spelling, find someone who will proofread your work and/or use the capabilities of your word processor before you turn work in to me. It is expected that you will do your assignments on a word processor unless I indicate that an assignment may be handwritten. Any other exceptions must be cleared with me in advance. Assignments that are not typed will be returned without a grade.

Course grades will be based on total points earned, and a 90-80-70-60 scale will be used to assign final grades. Grades will be based on the following:

Assignments (see following pages)	200 points
<u>Professionalism</u>	<u>20 points</u>
<b>TOTAL</b>	<b>220 points</b>

Your grade for Professionalism will be based on arriving on time and prepared for class, class participation (which includes both your contributions and your reactions to the contributions of others), your response to constructive feedback in the classroom and on written work, and exhibiting a professional demeanor (language, attitude) toward others. Written work will be assessed on the quality of your writing as well as your interpretation and understanding of course content.

University policies: All university policies with regard to withdrawals, early final exams, academic honesty, etc. will be strictly followed. It is your responsibility to be familiar with these policies. All academic work must meet the standards contained in “A Culture of Honesty.” All students are responsible to inform themselves about those standards before performing any academic work.

**Tentative Schedule**

The course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary.

<b>Date</b>	<b>Topic</b>	<b>Assignment due</b>
Aug. 18	Introduction, Time & Money	
Aug. 20	Time & Money	
Aug. 25	Time & Money	
Aug. 27	Fractions & Decimals	Time/Money task
Sept. 1	<b>No Class–Labor Day</b>	
Sept. 3	Fractions & Decimals	
Sept. 8	Geometry	
Sept. 10	Geometry	
Sept. 15	Geometry	
Sept. 17	Geometry	
Sept. 22	Measurement	Geometry task
Sept. 24	Measurement	
Sept. 29	Measurement	
Oct. 1	Assessment	Measurement task
Oct. 6	Assessment	
Oct. 8	Assessment	Assessment task
Oct. 13–Nov. 7	<b>No Class on Campus Field Experience Field assignments due Oct. 20, 27, Nov. 3</b>	
Nov. 10	Data Analysis & Probability	
Nov. 12	Data Analysis & Probability	
Nov. 17	Data Analysis & Probability	
Nov. 19	Data Analysis & Probability	Data analysis task
Nov. 26, 26	<b>No Class–Thanksgiving</b>	
Dec. 1	Algebra	Draft of final paper
Dec. 3	Algebra	
Dec. 8	Algebra	
Dec. 17	<b>Final paper due</b>	

### Assignment Overview

Assignment	Points
1. Time or Money tasks	20 (10 each)
2. Geometry tasks	30 (10 each)
3. Spaghetti & Meatballs for All lesson plan	25
4. Assessment items	35
5. Field assignments	30 (10 each)
7. Data analysis video tape	20
8. Final reflection	40

#### TIME/MONEY

Find one published activity pertaining to time and another pertaining to money. Modify the original activity so that the new one is more student-centered/more interactive. Explain why/how the new task is more student-centered and/or interactive. Your new task should target the same content as the original task (e.g., if the original is about making change, the new one should be about making change.) Describe your revised activity in narrative form in enough detail that a substitute teacher could conduct the activity successfully. Provide the original activity in enough detail that I can figure out what the task was.

#### GEOMETRY

Select 3 published geometry activities/tasks and modify them so that they are at a higher cognitive level. Your new activities should address the same mathematical content as the original. In other words, if the original activity is about symmetry, the new activity should also be about symmetry. Explain why your new activity is at a higher cognitive level. Describe the new activity in narrative form in enough detail that a substitute teacher could conduct the activity successfully. Also, develop a list of 3-5 hints/scaffolds you would provide for students who are struggling with this new activity. The hints/scaffolds should be specific to the activity. In other words, do not say you will allow students to work in pairs as a scaffold. Provide the original activity in enough detail that I can figure out what the task was.

#### MEASUREMENT

I will read the book *Spaghetti and Meatballs for All* by Marilyn Burns in class. Your task is to write a plan for a measurement lesson that includes this book. Your lesson should be prepared for a 3<sup>rd</sup> grade class of heterogeneously grouped students. Your lesson plan should be thorough enough that a substitute teacher could pick it up and implement it successfully. Instead of writing objectives for your lesson plan, include the following:

- What should students *know* at the end of this lesson? (e.g., facts, vocabulary)
- What should students *understand* at the end of this lesson? (e.g., concepts, ideas)
- What should students *be able to do* at the end of this lesson? (e.g., skills)

### ASSESSMENT

CRCT practice test items are provided on WebCT. Select 3 items and copy and paste them into a word processing file. For each item, identify the mathematical idea that is being assessed and write an open-ended version of the problem to assess *the same idea*. Your items should reflect the characteristics of open-ended assessment that we discuss in class. In other words, do not simply take a multiple-choice computational item (such as  $27 + 54$ ) and take away the choices to make it open-ended. You may not use items from the web site that I demonstrate in class for this assignment. You should make up your own assessment items. In addition, for one of the items that you develop you should create an assessment rubric that describes what work that does not meet standard would look like, what work that meets the standard would look like, and what work that exceeds the standard would look like.

### FIELD EXPERIENCE

During your field experience for ECE I hope that you will take advantage of every opportunity you have to observe mathematics being taught, to teach lessons yourself, to run math centers, and to assist individual children with mathematics. You should select 3 of the following tasks to complete and turn in for a grade.

Option #1: Write a 500-word paper describing and critiquing the mathematical environment of your field experience classroom. Things on which you might comment include but are not limited to: visual displays in the classroom related to mathematics, learning materials available to students and how they are used, technology related to mathematics and how it is used, how students are grouped for mathematics instruction, how cooperation and competition are used during mathematics instruction, and when mathematics instruction takes place during the day.

Option #2: Teach a mathematics lesson (whole class, small group, center, calendar time). Turn in your written lesson plan and a 500-word reflection on the lesson. In the reflection include responses to the following questions:

- Was this a teacher-centered or student-centered lesson? (Some parts of the lesson may have been teacher-centered while others were student-centered. Articulate where these changes occurred.) Provide evidence to support your answer. (What happened in the lesson that was teacher-centered or student-centered?) Why was the lesson this way? (What obstacles or opportunities did you have in planning and implementing this lesson?)
- What would you do differently if you could teach this lesson again
  - in the same classroom?
  - in your own classroom?

Option #3: Prepare an activity for students to do at home with their families. The activity should relate to a topic your teacher is addressing during mathematics instruction or a topic on which the students need additional work. If at all possible, you should actually send the activity home with children and encourage them to do it with their families. Then talk informally with children who have done the activity at home. Turn in a copy of the activity and write a 500-word paper on how and why you designed the activity and any student reactions you were able to gather.

Option #4: Read a children's literature book related to mathematics to your students. Use good instructional practices, such as reading with inflection, asking questions as you read, engaging

students in predicting what will happen next, etc. Write a 500-word paper explaining why you selected the book, what mathematics you hoped to highlight, what happened during the discussion, and what you see as the value of using children's literature in mathematics.

Option #5: Review student work from a particular lesson or activity. Provide copies of one piece of student work that shows a high level of understanding, one piece that shows a moderate level of understanding, and one piece that shows a low level of understanding. Explain how you selected these pieces of student work and why you classified them as you did. (Remove students' names from the work before turning it in.)

Option #6: Negotiate an alternative assignment with me if these assignments do not work in your field experience classroom or if you have a unique opportunity to do a different type of assignment (such as a math fair).

### **DATA ANALYSIS**

For this assignment, you will investigate the classroom discourse that occurs in the classroom episode in the *Lady Bugs* tape. You may complete this assignment in groups of no more than four people. If you choose to work with a group, you should turn in one paper with all of your names on it, and you will all receive the same grade for the assignment.

In your paper, you should describe and evaluate the manner in which the lesson meets the standards for teaching identified by the National Council of Teachers of Mathematics. I will distribute a copy of these standards in class. In addition, you should describe and evaluation the extent to which this is an equitable classroom.

### **FINAL REFLECTION PAPER**

Consider your learning across MATH 5001, 5002, 5003, EMAT 3400, and 3410. (In other words, you are not restricted to what you have learned in this course.) Select one of the following ways to demonstrate what you have learned thus far:

- Select an assignment from an EMAT or MATH course that you would do differently today than when you did it initially. Redo the assignment and describe how/why it is different from your first attempt. (Include a copy of your first attempt if you have it.)
- Select 2 assignments from EMAT or MATH courses that show a contrast in your thinking (mathematical or pedagogical). Describe the contrast and what might have led to the change.
- Select a topic or an issue in mathematics education that you disagree with, find confusing, have questions about, or are unsure how you feel about. Carefully and thoroughly articulate your views, making reference to materials, texts, or experiences from courses as appropriate.