

Spring 2009 Syllabi
ELED 4313.042
Teaching Mathematics in the Elementary School
Monday 4:00-5:50 BRB 1030

Instructor Information

Dr. John Lamb
BEP 229C
M,T,W: 9:00am-10:00am
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Course Catalog Description

Scope and sequence of the elementary mathematics curriculum, materials, and selected instructional techniques.
Prerequisites: MATH 1350, MATH 1351, EDUC 3310 and EPSY 3330, admission to Educator Preparation Program.

Student Learning Outcomes & Assessments

The students will be able to:

- Describe the National Council of Teachers of Mathematics process and content standards for elementary and middle school mathematics. (Learning Outcomes 2.2)
- Use the Texas Essential Knowledge and Skills (TEKS) to access teaching objectives for elementary and middle school mathematics, and use the TEKS objectives in planning lessons and activities. (Learning Outcomes 1.1, 2.2, and 8.3)
- Discuss a plan for life long learning to correlate with the TEKS, the Texas Assessment of Knowledge and Skills (TAKS), and the National Council of Teachers of Mathematics professional standards, as well as discuss a plan for communication with families and communities. (Learning Outcomes 2.2, 2.5, 2.7, 5.1, 10.1, and 10.2)
- Create and discuss instructional plans using manipulative materials, in both discovery and direct instructional models. (Learning Outcomes 1.1, 1.2, 2.1, 2.3, 2.4, 2.8, 3.1, 3.2, 6.1, 6.2, 7.2, 8.2, and 8.4)
- Create and discuss instructional plans that integrate technology, as well as discuss the role of technology in the teaching and learning of mathematics. (Learning Outcomes 1.1, 1.2, 2.1, 2.3, 2.5, 2.8, 3.2, 6.1, 6.2, 7.3, 8.2, 8.4, 9.1, 9.2, and 10.1)
- Create and discuss instruction that promotes discourse, questioning, listening, reading, and writing in the mathematics classroom. (Learning Outcomes 2.6, 2.8, 3.1, 4.2, 6.1, 6.2, 7.1, 7.2, 7.3, 8.2, 8.4, 10.1, and 10.2)
- Discuss various assessment techniques and design lessons using multiple assessment methods. (Learning Outcomes 2.3, 2.4, and 8.4)
- Discuss issues related to planning, implementing, and assessing the teaching and learning of mathematics illustrated through the application of higher-order thinking skills in the exploration of current research. (Learning Outcomes 2.1, 2.5, 2.6, 3.1, 4.3, 8.2, 8.3, 8.4, 10.1, and 10.2)
- Reflect on the teaching and learning of mathematics and how to adapt instruction based on this reflection. (Learning Outcomes 2.5, 4.1, 4.2, 7.3, 8.1, 8.3, 10.1, and 10.2)

Evaluation and Grading

Attendance/Class Participation	5%
Professional Journal Article Critiques	10%
Teacher Lesson Plans	40%
Activity File	15%
Math, Me, and My Philosophy paper	10%
Exams	20%
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TOTAL	100%

A = 90-100% C = 70-79% B = 80-89% D = 60-69% F = 0-59%

NOTE: I expect that for every hour spent in class, two hours should be spent outside of class reading and working on assignments.

Teaching Strategies

1. Attendance/Class participation: The student will be required to read text chapters as assigned, participate in discussions, and work collaboratively and cooperatively with classmates. Attendance and participation is essential. Attendance plays a large role in attaining full credit for the participation requirements of this class. Many class discussions and activities will result in written assignments that cannot be made up if class is missed.

2. Professional Journal Article Critiques: Each student will critique **two** professional journal articles pertaining to issues in elementary mathematics instruction. These journal articles are **available on Blackboard**. Each article critique must be **no less than 2** pages in length, word-processed, double-spaced except for heading, and typed in Times New Roman 12 font. **A format for the critiques is attached.**

3. Teacher Lesson Plans: Each student is required to create **two 30-45 minute lesson plans** using manipulatives and/or technology. **The lesson plans must be on third or fourth grade topics.** Two templates for these lesson plans are provided in the attachments. The lesson plan evaluation rubric is also available.

4. Activity File: Each student will research and collect activities and resources appropriate for implementing in EC-6 classroom. This activity file will provide activities in seven categories. **A description and grading rubric is attached.**

5. Math, Me, and My Philosophy paper: Each student is required to write a 3-5 page paper discussing their personal **history and relationship** with mathematics from elementary school through college **followed by their philosophy** of teaching mathematics.

6. Exams: There are two scheduled exams. Each exam will have two sections. The first section will cover knowledge-based information acquired through chapter readings and class lectures. The second section will be performance based covering applicable knowledge of teaching methods covered in readings and class discussions.

Related Field Experiences

Thirty hours of field are connected to this course. Completion or non-completion of the field requirements set by the School of Education accounts for 31% of the students overall average percentage score in this course. If a student successfully completes his/her field requirements, 69% of their final percentage score will be calculated using the above assignments' total weighted average and 31% of their final percentage score will reflect the above assignments' total weighted average. If a student fails to successfully complete their field obligation, 69% of their final percentage score will be calculated using the above assignments' total weighted average and 31% of their final percentage score will reflect a 0% completion score therefore preventing the student from passing the course with a "C" or better. Below describes the grade assignment based on the calculated percentage score:

Required Text, Materials/Supplies, and Related Readings

Cathcart, W. G., Pothier, Y. M., Vance, J. H., & Bezuk, N. S. (2006). *Learning mathematics in elementary and middle schools: A learner-centered approach* (4th Ed.). Upper Saddle River, NJ: Pearson Education.

Philipp, R., & Cabral, C. P. (2005). *IMAP: Integrating mathematics and pedagogy to illustrate children's reasoning*. San Diego State University Foundation.

Optional Text and Materials

Donovan, M. S., & Bransford, J. D. (Eds) (2005). *How students learn: History, mathematics, and science in the classroom*. Washington, D.C.: The National Academies Press.

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

Additional Text Resources

Burns, M. (2000). *About teaching mathematics: A K-8 resource*. Sausalito, CA: Math Solutions Publications.

Reys, R.E., Lindquist, M. M., Lambdin, D. V., Smith, N. L., & Suydam, M. N. (2004). *Helping children learn mathematics* (7th Ed.). New York: John Wiley & Sons Inc.

Van de Walle, J. A. (2004). *Elementary and middle school mathematics: Teaching developmentally* (5th Ed.). Boston: Pearson Education, Inc.

Internet Resources

TEA <http://www.tea.state.tx.us/>

National Technology Standards <http://cnets.iste.org/index2.html>

National Council of Teachers of Mathematics <http://www.nctm.org>
 National Library of Virtual Manipulatives <http://nlvm.usu.edu/en/nav/vlibrary.html>
 Shodor Interactivate <http://www.shodor.org/interactivate>
 Database search for educational journals <http://library.uttyler.edu/>
 Creative Publications www.creativepublications.com
 ETA/Cuisenaire www.eta-cuisenaire.com
 Texas Instruments <http://education.ti.com/>
 AIMS www.AIMSedu.org
 Eye on Education www.eyeeoneducation.com
 Casio <http://www.casio.com/education/>
 NASCO www.eNASCO.com

Course Policies (attendance, make-up assignments, etc.)

All assignments are due on or before the dates provided in the **Topical Outline**. No email attachments will be accepted. Ten percentage points will be reduced from your assignment score for each calendar day the assignment is late. Assignment dates may be moved to later (but not earlier) scheduled dates during the course of the semester. All exam dates are final. If an exam is not taken due to a documented illness, funeral, or other university related activity, then a make-up date must be scheduled with the professor.

Topical Outline

Date	Reading Prior to Class	Topic	Assignment Due
January 12, 2009		Introduction and Problem Solving	
January 26, 2009	Chapters 1 and 2	Problem Solving and Technology	First Journal Critique
February 2, 2009	Chapters 3 and 5	Numeration	
February 9, 2009	Chapters 6 and 7	Numeration	
February 16, 2009	Chapter 17	Algebraic Thinking	First Lesson Plan
February 23, 2009		Algebraic Thinking	
March 2, 2009		First Exam	First Exam
March 16, 2009	Chapters 10, 11, and 12	Fractions, Ratios, and Percents	Second Journal Critique
March 23, 2009	Chapter 14	Geometry and Measurement	
March 30, 2009	Chapter 15	Geometry and Measurement	Second Lesson Plan
April 6, 2009	Chapter 16	Data Analysis and Statistics	
April 13, 2009		Data Analysis and Statistics	Activity File
April 20, 2009	Chapter 4	Assessment	
April 27, 2009	Chapters 8 and 9	Whole Numbers	Math, Me, and My Philosophy Paper
May 4, 2009		Final Exam	Final Exam

University Policies

Grade Replacement/Forgiveness

If you are repeating this course for a grade replacement, you must file an intent to receive grade forgiveness with the registrar by the 12th day of class. Failure to do so will result in both the original and repeated grade being used to calculate your overall grade point average. Undergraduates will receive grade forgiveness (grade replacement) for only three course repeats; graduates, for two course repeats during his/her career at UT Tyler.

Disability Services

If you have a disability, including a learning disability, for which you request disability support services/accommodation(s), please contact Ida MacDonald in the Disability Support Services office so that the appropriate arrangements may be made. In accordance with federal law, a student requesting disability support services/accommodation(s) must provide appropriate documentation of his/her disability to the Disability Support Services counselor. In order to assure approved services the first

week of class, diagnostic, prognostic, and prescriptive information should be received 30 days prior to the beginning of the semester services are requested. For more information, call or visit the Student Services Center located in the University Center, Room 282. The telephone number is 566-7079 (TDD 565-5579). Additional information may also be obtained at the following UT Tyler Web address: <http://www.uttyler.edu/disabilityservices>.

Student Absence due to Religious Observance

Students who anticipate being absent from class due to a religious observance are requested to inform the instructor of such absences by the second class meeting of the semester.

Student Absence for University-Sponsored Events and Activities

If you intend to be absent for a university-sponsored event or activity, you (or the event sponsor) must notify the instructor at least two weeks prior to the date of the planned absence. At that time the instructor will set a date and time when make-up assignments will be completed.

Social Security and FERPA Statement:

It is the policy of The University of Texas at Tyler to protect the confidential nature of social security numbers. The University has changed its computer programming so that all students have an identification number. The electronic transmission of grades (e.g., via e-mail) risks violation of the Family Educational Rights and Privacy Act; grades will not be transmitted electronically.

Student Standards of Academic Conduct

Disciplinary proceedings may be initiated against any student who engages in scholastic dishonesty, including, but not limited to, cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts.

(i) "Cheating" includes, but is not limited to:

- copying from another student's test paper;
- using during a test, materials not authorized by the person giving the test;
- failure to comply with instructions given by the person administering the test;
- possession during a test of materials which are not authorized by the person giving the test, such as class notes or specifically designed "crib notes". The presence of textbooks constitutes a violation if they have been specifically prohibited by the person administering the test;
- using, buying, stealing, transporting, or soliciting in whole or part the contents of an unadministered test, test key, homework solution, or computer program;
- collaborating with or seeking aid from another student during a test or other assignment without authority;
- discussing the contents of an examination with another student who will take the examination;
- divulging the contents of an examination, for the purpose of preserving questions for use by another, when the instructor has designated that the examination is not to be removed from the examination room or not to be returned or to be kept by the student;
- substituting for another person, or permitting another person to substitute for oneself to take a course, a test, or any course-related assignment;
- paying or offering money or other valuable thing to, or coercing another person to obtain an unadministered test, test key, homework solution, or computer program, or information about an unadministered test, test key, homework solution or computer program;
- falsifying research data, laboratory reports, and/or other academic work offered for credit;
- taking, keeping, misplacing, or damaging the property of U. T. Tyler, or of another, if the student knows or reasonably should know that an unfair academic advantage would be gained by such conduct; and,
- misrepresenting facts, including providing false grades or resumes, for the purpose of obtaining an academic or financial benefit or injuring another student academically or financially.

(ii) "Plagiarism" includes, but is not limited to, the appropriation, buying, receiving as a gift, or obtaining by any means another's work and the submission of it as one's own academic work offered for credit.

(iii) “Collusion” includes, but is not limited to, the unauthorized collaboration with another person in preparing academic assignments offered for credit or collaboration with another person to commit a violation of any section of the rules on scholastic dishonesty.

CEP Vision and Mission and Program Standards

School of Education MISSION STATEMENT

The Bachelor of Science in Interdisciplinary Studies (BSIS) degree prepares students to become teachers in the public school system. The degree offers students a focused exposure to theories of learning, practical applications and clinical experiences in the school setting. The curricula for the BSIS programs are aligned with national and state principles for the preparation of beginning teachers.

INTASC Standards

1. Subject Matter: The student understands the central concepts, tools of inquiry, and structures of the discipline(s) he or she teaches and can create learning experiences that make these aspects of subject matter meaningful for children.
2. Student Learning: The student understands how children and youth learn and develop, and can provide learning opportunities that support their intellectual, social and personal development.
3. Diverse Learners: The student understands how children differ in their approaches to learning and create instructional opportunities that are adapted to diverse learners.
4. Instructional Strategies: The student understands and uses a variety of instructional strategies to encourage children’s development of critical thinking, problem solving, and performance skills.
5. Learning Environment: The student 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. Communication: The student uses knowledge of effective verbal, nonverbal, and media communication techniques to foster active inquiry, collaboration, and supportive interaction in the classroom.
7. Planning Instruction: The student plans and manages instruction based upon knowledge of subject matter, children, the community, and curriculum goals.
8. Assessment: The student understands and uses formal and informal assessment strategies to evaluate and ensure the continuous intellectual, social and physical development of the learner.
9. Reflection and Professional Practice: The student is a reflective practitioner who continually evaluates the effects of her/his choices and actions on others (students, parents, and other professionals in the learning community) and who actively seeks out opportunities to grow professionally.
10. Collaboration, Ethics, and Relationships: The student communicates and interacts with parents/guardians, families, school colleagues, and the community to support children’s learning and wellbeing.

Attachments: (other specific information about course requirements, etc.)

-A- Journal Critique Format

(NO LESS THAN TWO DOUBLE SPACED PAGES IN TIMES NEW ROMAN SIZE 12 FONT)

(Provide a Header with your Name, Course Code, Critique #___, and Date)

➤ **(2 pts) APA 5th Edition Reference:**

Author’s Last Name, First Initial. Second Initial. (year). Title of article. *Title of Publication*, Volume # (Issue Number), Pages.

Examples:

Baxter, J. A. (2005). Some reflections on problem posing: A conversation with Marion Walter. *Teaching Children Mathematics*, 12(3), 122-128.

Stein, M. K., & Bovalino, J. W. (2001). Manipulatives: One piece of the puzzle. *Mathematics Teaching in the Middle School*, 6(6), 356-359.

- **(3 pts) Purpose:** (Write two to three sentences in your own words stating the purpose of the article.)
- **(8 pts) Summary:** (Write one paragraph for each main idea. Put summary in your own words.)
- **(7 pts) Reaction:** (Write your personal reaction and perceptions of the article you read in 1st person)

-B- Teacher Modeling Lesson Plan Format

(Provide a Header with your Name, Course Code, Critique #___, and Date)

- **(1 pt) Title:**

- **(5 pts) Objective:** *ABCD: Audience, student Behavior, Condition under which the student will complete the behavior, Degree of performance. (TSW or TLW *action verb* _____using_____with__accuracy)
**Make sure your objectives answer the following questions: *Do the objectives reflect several types or levels of learning and are they significant and challenging? Are the objectives clearly stated as learning outcomes? Are the objectives developmentally appropriate? Do the objectives meet the needs of the students? Are the objectives explicitly aligned with national, state, or local standards?*
- **(1 pt) Grade Level:**
- **(3 pts) TEKS:** What are the TEKS that relate to my objective? Example:
TEKS 3.15 A The student is expected to identify the mathematics in everyday situations.
TEKS 3.14 B The student is expected to interpret information from pictographs and bar graphs.
- **(2 pts) Materials:** What do I need to complete this lesson? Be specific in the amount of needed materials.
- **(1 pt) Safety:**
- **(2 pts) Concepts:** What are the major mathematical concepts (not procedures) students will learn? Give examples and nonexamples
- **(1 pt) Vocabulary:** What are the major vocabulary words students should know or learn? Provide definitions.
- **(3 pts) Introduction of Lesson:** What will you, the teacher, do to get students ready for learning? (NOT new learning) (Relate to the objective, Activate prior knowledge, GRAB THEIR ATTENTION)
- **(5 pts) Modeling/Demonstration:** Describe how you, the teacher, are going to model the objective BEFORE the students participate. Draw any manipulations you will conduct on the overhead, etc. in your lesson plan. **Provide ALL questions you will ask and behaviors you will observe that will facilitate learning and check for understanding.** This is a detailed outline of what you, the teacher, are going to do.
- **(5 pts) Guided Practice:** Describe the activity you will have the students participate in as you guide their learning. This should relate to the actions you modeled in the Modeling/Demonstration section. Provide any types of questions that will facilitate learning. This is a detailed outline of what you, the teacher, are going to do with the students. **Provide ALL questions you will ask and behaviors you will observe that will facilitate learning and check for understanding. *Provide activity sheets or any handouts.**
- **(5 pts) Closure:** Describe how you, the teacher, will review the objectives with the students. Critical attributes of the closure must relate to your objective and must check to see if students have an understanding of the objective. NOTE: **This is not another activity.** Make sure your closure answers the following questions: *Does the teacher determine student understanding and emphasize key elements of learning at the conclusion of the lesson? Are specific questions used in the closure to help guide the teacher's instructional decision-making?*
- **(5 pts) Contextual Factors:** Write a paragraph or two addressing the following questions: *Describe how your lesson displays an understanding of classroom organization and structure. Discuss how you the teacher will address student differences that may affect learning during the lesson (e.g., differing cognitive abilities)? Discuss how you the teacher will address the different ways students learn that may affect learning during the lesson?*

-C- 5E Modeling Lesson Plan Format (descriptions of levels taken from <http://www.bsos.org/pdf/bsos5eexecsummary.pdf>)
(Provide a Header with your Name, Course Code, Critique # ____, and Date)

- **(1 pt) Title:**
- **(5 pts) Objective:** *ABCD: Audience, student Behavior, Condition under which the student will complete the behavior, Degree of performance. (TSW or TLW *action verb* _____using_____with__accuracy)
**Make sure your objectives answer the following questions: *Do the objectives reflect several types or levels of learning and are they significant and challenging? Are the objectives clearly stated as learning outcomes? Are the objectives developmentally appropriate? Do the objectives meet the needs of the students? Are the objectives explicitly aligned with national, state, or local standards?*
- **(1 pt) Grade Level:**
- **(3 pts) TEKS:** What are the TEKS that relate to my objective? Example:
TEKS 3.15 A The student is expected to identify the mathematics in everyday situations.
TEKS 3.14 B The student is expected to interpret information from pictographs and bar graphs.
- **(2 pts) Materials:** What do I need to complete this lesson? Be specific in the amount of needed materials.
- **(1 pt) Safety:**
- **(2 pts) Concepts:** What are the major mathematical concepts (not procedures) students will learn? Give examples and nonexamples
- **(1 pt) Vocabulary:** What are the major vocabulary words students should know or learn? Provide definitions.

- **(5 pts) Engage:** The teacher or a curriculum task accesses the learners' prior knowledge and helps them become engaged in a new concept through the use of short activities that promote curiosity and elicit prior knowledge. The activity should make connections between past and present learning experiences, expose prior conceptions, and organize students' thinking toward the learning outcomes of current activities.
- **(5 pts) Explore:** Exploration experiences provide students with a common base of activities within which current concepts (i.e., misconceptions), processes, and skills are identified and conceptual change is facilitated. Learners may complete lab activities that help them use prior knowledge to generate new ideas, explore questions and possibilities, and design and conduct a preliminary investigation.
- **(5 pts) Explain:** The explanation phase focuses students' attention on a particular aspect of their engagement and exploration experiences and provides opportunities to demonstrate their conceptual understanding, process skills, or behaviors. This phase also provides opportunities for teachers to directly introduce a concept, process, or skill. Learners explain their understanding of the concept. An explanation from the teacher or the curriculum may guide them toward a deeper understanding, which is a critical part of this phase.
- **(5 pts) Elaborate:** Teachers challenge and extend students' conceptual understanding and skills. Through new experiences, the students develop deeper and broader understanding, more information, and adequate skills. Students apply their understanding of the concept by conducting additional activities.
- **(5 pts) Evaluation:** The evaluation phase encourages students to assess their understanding and abilities and provides opportunities for teachers to evaluate student progress toward achieving the educational objectives.

-D- Activity File Format

(This is due in a three ring binder as big as you need)

Description:

Your task is to collect good, creative activities and resources that would be appropriate for use with students you will teach. The activities might be articles that you find in a journal or unusual activities that you find in a teacher resource. **THEY SHOULD NOT BE SKILL-DRIVEN WORKSHEETS.** Activities that I give you in class or activities copied from your textbook should **NOT** be included in the activity file you submit. Also, do **NOT** get all your resources from the same source. Use this opportunity to find out where to obtain innovative ideas. Once you are a practicing teacher, you want to know where to look in a hurry to find what you need. Be sure to abide by copyright regulations. You may organize the file in a manner that is useful to you. However, I want to see evidence that you have collected activities in the following areas:

- Numeration (Number, operation, and quantitative reasoning)
- Patterns (Patterns, relationships, and algebraic thinking)
- Geometry (Geometry and spatial reasoning)
- Measurement
- Probability and Statistics
- Problem Solving
- Miscellaneous (Multicultural connections, literature connections, etc)

Grading Guideline:

A (90-100 points). At least 40 good activities balanced among the categories, at least five different resources, and evidence of good organization.

B (80-89 points). At least 35 activities balanced among the categories, at least four different resources, and evidence of good organization.

C (70-79 points). At least 30 different activities balanced among the categories, at least three different resources, and adequate organization.

How valuable a resource this is will depend on the energy and effort that you put into it. Just having a set number of activities is not enough for a given grade. Your file is also evaluated on the quality of the activities, the nature of the resources, and its organization. Your file must include a detailed Table of Contents illustrating each section and its contents. There must also be a list of the resources (Journal, Periodical, Website, etc) and the activities or articles found in each. Possible resources include *Journal of Research in Mathematics Education*, *Mathematics Teaching in the Middle School*, *Mathematics Teacher*, and *Teaching Children Mathematics*.