

GOVERNORS STATE UNIVERSITY  
College of Education/Division of Education

COURSE SYLLABUS

COURSE TITLE: Teaching Mathematics in Elementary Schools  
COURSE NUMBER: ELED 463  
CREDIT HOURS: 3  
INSTRUCTOR: Dr. Lisa L. Chang  
Office: Room D34030  
Phone: 708-534-4373  
E-mail: l-chang@govst.edu  
TRIMESTER: Fall 2002



CATALOG DESCRIPTION:

Introduces prospective teachers to content, methods, and materials for elementary school mathematics. Explores options for making instructional decisions. **Prerequisites: Admission to Teacher Education; EDUC 321, EDUC 322, MATH 320, MATH 322; and concurrent enrollment in ELED 401, ELED 460, and ELED 466.**

RATIONALE:

Mathematics is an integral part of our everyday life. The learning of mathematics is obviously a necessity for elementary school children. However, most of the children in our schools have been taught the algorithms for obtaining correct answer with little understanding of arithmetic operations. Elementary school children need concrete type of mathematical experiences as a basis for understanding number theories and operations. Philosophy, purpose, and place of mathematics laboratory in the elementary school curriculum are also discussed so that the student can make intelligent decisions.

INTENDED AUDIENCE:

Undergraduate students in elementary education who have completed Lab I and are enrolled in both ELED 401 and Lab II.

INSTRUCTIONAL OBJECTIVES:

*The Conceptual Framework of the Professional Education Unit provides direction for teaching and learning for all teacher education programs. The Professional Education Unit at Governors State University strives to develop competent practitioners who operate at high cognitive levels and who make good decisions (i.e., use reasoned eclecticism) with regard to the application and testing of instructional strategies. Consistent with the Illinois Professional Teaching Standards and the Conceptual Framework of the Professional Education Unit, the following objectives will be the focus of this course.*

Given lectures, discussions, demonstrations, and laboratory experiences, students should be able to accomplish the objectives listed below.

1. Apply theories pertaining to how children learn mathematics in planning instruction.
2. Compare and contrast various approaches to instruction, such as discovery, learning, constructivism, and lectures.
3. Describe appropriate sequencing of mathematics topics within each of the major strands.

**INSTRUCTIONAL OBJECTIVES (cont'd.):**

4. Identify a wide variety of concrete instructional aids appropriate for teaching the major topics in the elementary mathematics curriculum and create inexpensive teacher-made aids for this purpose.
5. Identify and apply strategies appropriate for developing problem-solving ability.
6. Implement appropriate instructional models for teaching the meaning of the fundamental arithmetic operations and algorithms.
7. Apply appropriate teaching strategies for developing concepts and skills within each of the major strands at given grade levels.
8. Identify a variety of real-world situations and other curricular areas where mathematical concepts and procedures would be applied.
9. Discuss the relative strengths and weaknesses of printed materials such as textbook series and other curricular materials.
10. Discuss and analyze various grouping strategies in relationship to instructional goals and learning styles.
11. Discuss the strengths and limitations of integrating technology into instruction.
12. Use interview techniques and teacher-made tests to identify student error patterns and suggest appropriate diagnostic and remediation techniques.
13. Discuss and implement methods of individualizing instruction which address student diversity and children with special needs.
14. Discuss the implications of Illinois and NCTM standards for instruction and assessment.
15. Use research, professional journals, and other resources in planning instructional activities.
16. Display a professional disposition toward subject matter, colleagues, and students that they teach.

**INSTRUCTIONAL MODALITIES:**

Most class sessions will be divided into lecture and discussion periods and activities with concrete materials.

**DISABILITY STATEMENT:**

Students who have a disability or special needs and require accommodation in order to have equal access to the classroom, must register with the designated staff member in the Division of Student Development. Please go to Room B1201 or call (708) 534-4090 and ask for the Coordinator of Disability Services. Students will be required to provide documentation of any disability when an accommodation is requested.

**REQUIRED LEARNING ACTIVITIES:**

Students will be required to:

1. take and pass the midterm and final examinations.
2. complete all worksheets and class written activities, if any.
3. read and complete all required assignments in the text.
4. construct an inexpensive teacher-made aid for teaching mathematical concept, skill, or application at the level of his/her interest; write a brief report; and provide an in-class presentation of the aid.
5. visit, observe, and/or participate in two mathematics classrooms, one regular classroom, and one special education classroom, if possible. Emphasis should be placed on the mathematical characteristics and needs of individuals and teacher's questioning techniques.
6. perform an evaluative interview/testing, record the results, and prescribe learning experiences to alleviate any problems that exist or to further the child's mathematics skills.
7. develop and implement a minimum of three lesson plans to teach a specific mathematical content area based on the interview/testing results. Each plan must include: (a) instructional objectives; (b) teaching materials to be used (text and/or manipulative materials); (c) teaching procedures, including motivational techniques and questions to be asked; (d) evaluation; and (e) enrichment activities, when appropriate.

TENTATIVE TOPICAL OUTLINE

<i>Instructional Objectives</i>	<i>Sessions</i>	<i>Topic/Activities</i>	<i>Readings</i>	<i>Evaluation</i>
1, 3, 7	1-4	Attitudes, Goals, and Trends <ul style="list-style-type: none"> <li>• Attitudes concerning mathematics and assessment of math</li> <li>• Reasons for dislike and difficulties</li> <li>• Overview of teaching for meaning and real-world connections</li> <li>• Scope and sequence of math objectives</li> <li>• Meeting individual needs through the use of grouping strategies</li> <li>• How children learn mathematics</li> </ul>	Ch. 1-3; 5; 22-23	1-7
1, 2, 3, 4, 5, 6	5-6	Teaching Pre-number, Early Number, and Numeration Concepts <ul style="list-style-type: none"> <li>• Concrete to abstract sequencing</li> <li>• Grouping and place-value instructional aids</li> <li>• Forms of expanded notation</li> <li>• Textbook treatment of numeration</li> </ul>	Ch. 6, 9	1- 3; 5, 7
1, 2, 3, 5, 6, 7	7-8, 11-12	Whole Numbers <ul style="list-style-type: none"> <li>• Developing operation concepts</li> <li>• Strategies for learning basic facts</li> <li>• Concrete and pictorial models</li> <li>• Estimation</li> <li>• Transitional algorithms</li> <li>• Alternative algorithms</li> <li>• Diagnosis of error patterns and effective remediation strategies</li> <li>• Textbook treatment</li> </ul>	Ch. 7-8; 10-11	1- 3; 5-7
2	7-8	<b>Teacher-Made Aids</b>		
1, 2, 4, 5, 6, 7, 8	12	<b>Evaluative interview/testing and lesson plan due</b>		
1, 2, 3, 5, 6, 7, 8	16	<b>Midterm Examination</b>		
1, 2, 3, 5, 6, 7	14-19	Number Theory and Rational Number Concepts and Operations <ul style="list-style-type: none"> <li>• Factors, multiples, primes, composites</li> <li>• Concrete and pictorial models</li> <li>• Equivalent fractions and decimals</li> <li>• Alternative algorithms</li> <li>• Diagnosis of errors</li> <li>• Textbook treatment</li> </ul>	Ch. 12-14	1- 3, 5-7

**TENTATIVE TOPICAL OUTLINE (cont'd.)**

<i>Instructional Objectives</i>	<i>Sessions</i>	<i>Topic/Activities</i>	<i>Readings</i>	<i>Evaluation</i>
1, 2, 3, 5, 6	20-23	Teaching Geometry and Measurement <ul style="list-style-type: none"> <li>• Awareness geometry</li> <li>• 3-dimension to 1-dimension</li> <li>• Textbook treatment and alternatives</li> <li>• Measurement process</li> <li>• Estimation</li> </ul>	Ch. 16-17	1-3; 5-7
1, 2, 3, 4, 8	24-25	Problem Solving <ul style="list-style-type: none"> <li>• Small group problem solving</li> <li>• Problem solving process</li> <li>• Points of view on teaching problem solving</li> <li>• Presenting problems at the primary and intermediate/junior high levels</li> <li>• Questioning and problem explanations</li> <li>• Textbook treatment</li> </ul>	Ch. 4	5-8
1, 2, 3, 6, 8	26-27	Exploring Concepts of Statistics, Probability, and Preparing for Algebra	Ch. 19-20	1- 3; 5-7
9	28-29	Using Microcomputers and Calculators in Teaching Mathematics	Ch. 24	1-3; 5-7
1, 2, 4, 5, 6, 9, 10	30	<b>FINAL EXAMINATIONS</b>		

**DEADLINES FOR WRITTEN WORK:**

Session 7-8	Teacher-Made Aid (in class presentation)
Session 10	Completion of Mathematics Classroom Visitation (no written work required)
Session 12	Evaluative Testing and Lesson Plans
Session 16	Midterm Exam
Session 30	Final Exam

**EVALUATION:**

1. Evaluation will be made on the basis of the following:
  - (a) the quality of the written work (evaluative interview/test and attitude inventory (12%),
  - (b) lesson plans (18%),
  - (c) the score on the midterm examination (20%),
  - (d) the presentation of teacher-made aid (10%),
  - (e) the score on the final examination (25%), and
  - (f) the scores on quizzes (15%).

**Good attendance is required.**

**EVALUATION (cont'd.):**

The grading system for this class will be as follows:

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

2. Students enrolled in this course are required to take ELED 401 and Teaching Laboratory II concurrently.
3. The learning activities involving written work should be **typewritten** and must be turned in **before or on** the suggested deadlines.
4. Students enrolled in this course must complete all required work by the end of the trimester. No one will be granted credit after that date.
5. A grade of "C" for the midterm and final examinations is a must for any student who wishes to receive at least a "C" for the course.
6. Make-up tests will not be entertained without sufficient supporting evidence.
7. Students having problems in content knowledge, professional knowledge/skills, or disposition, will be referred to the DOE Student Progress Committee by the end of the trimester.
8. Your work and participation in class, while being one indication of your knowledge of course material, also reflects your dispositions with regard to becoming an effective mathematics teacher. As in all courses in the Elementary Education program, the following dispositions will be monitored:
  - professional behavior,
  - appreciation of human diversity,
  - commitment to collaboration with colleagues,
  - commitment to ethical behavior,
  - commitment to life-long learning, including professional development, and
  - habits of mind that reveal reasoned eclecticism.

As indications of positive and professional dispositions, we expect students to:

- be actively involved during in-class activities,
- contribute to class discussion,
- be on time for class and when submitting assignments, and
- cooperate in and make significant contributions to group planning of lessons.

Your interactions with faculty, other candidates, and students should also be consistent with the dispositions listed above.

**BIBLIOGRAPHY:**

The required text for the course is:

Van de Walle, John A. (2000). *Elementary and middle school mathematics – Teaching developmentally* (4<sup>th</sup> ed.). New York: Longman Publishing.

Other related articles are from the following periodicals:

- *Teaching Children Mathematics (Pre-K and Elementary Grades)*
- *Mathematics Teaching in the Middle School*
- *Elementary School Journal*
- *Harvard Educational Review*
- *Journal of Education*
- *Journal of Special Education*
- *Journal of Teaching and Learning*
- *Journal of Research in Mathematics Education*
- *Peabody Journal of Education*
- *American Educational Research Journal*
- *Exceptional Children*
- *Illinois Mathematics Teacher*
- *Journal of Educational Research*
- *Journal of Teacher Education*
- *The Mathematics Teacher*
- *Mathematics Teaching*
- *School Mathematics and Science*
- *Theory Into Practice*
- *Today's Education*