

LAGUARDIA COMMUNITY COLLEGE
CITY UNIVERSITY OF NEW YORK
DEPARTMENT OF MATHEMATICS, ENGINEERING and COMPUTER SCIENCE

MAT 104 — MATHEMATICS IN ELEMENTARY EDUCATION
3 class hours, 3 credits

Catalog Description:

This is the second course of a two-semester sequence devoted to the study of how children learn mathematics. The course examines the mathematics curriculum of the elementary school with an emphasis on how to teach it. Among the topics included are operations on rational numbers, geometry and measurement, and basic notions of statistics of particular value to prospective school teachers and paraprofessionals.

Instructional Objectives:

1. To familiarize students with the New York State P-12 Common Core Learning Standards for School Mathematics.
2. To teach students how children construct mathematical concepts and skills.
3. To introduce students to different models of mathematics teaching used in the classroom.
4. To guide students in utilizing problem solving as a way of teaching mathematics and developing mathematical ideas.
5. To impress upon students the importance of patterns in mathematics and enable them to incorporate patterns into their mathematics teaching.
6. To introduce students to the use of technology in the mathematics classroom.
7. To reinforce students' understanding of and proficiency with fractions, decimals, percents, ratios, and proportions.
8. To strengthen students' knowledge of the basic principles of involving estimation, measurement and geometry, probability and statistics, and algebra, including functions.

Performance Objectives:

1. Demonstrate knowledge of the Common Core Learning Standards.
2. Describe the cognitive processes by which children construct mathematical concepts and skills.
3. Describe different models of mathematics teaching used in the classroom.

4. Demonstrate problem-solving strategies (particular Pólya's techniques) and show how they are used to teach children mathematics.
5. Describe how patterns are vital to mathematics and show ways to use patterns in mathematics teaching.
6. Understand both productive and unproductive uses of technology in the mathematics classroom.
7. Correctly perform operations with fractions, decimals, percents, ratios, and proportions.
8. Solve problems and create developmentally appropriate units and lessons involving estimation, measurement and geometry, probability and statistics, and algebra, including functions.

Main Textbook

Mathematics for Elementary Teachers with Activity Manual Volume 2

Third Custom Edition for LaGuardia Community College

Author: Sybilla Beckmann

Publisher: Pearson, 2011

Supplementary Textbook (on reserve in the library)

Elementary and Middle School Mathematics: Teaching Developmentally

Fifth Edition

Author: John A. Van de Walle

Publisher: Pearson, 2003

Class Activities

The manual activities are carefully integrated into the course and the manual is placed at the back of the Beckmann book. Please remember to bring this book to every class meeting.

Evaluation

To earn a passing grade of C, you must:

- a. Achieve an average of at least 70% in two one-hour in-class tests and the final exam.
- b. Attend classes on a regular basis — specifically, absences must not exceed five.

To obtain a grade of A or B, you must complete a project consisting of a set of lesson plans specified by the instructor.

Weekly Outline

Please note: Chapters from the main textbook, *Mathematics for Elementary Teachers Volume 2* by Beckmann, are indicated by *. Chapters from the supplementary textbook, Van de Walle's *Elementary and Middle School Mathematics: Teaching Developmentally*, are indicated by +. You can use the supplementary material to enhance your understanding of how children learn the mathematical concepts discussed in your main textbook.

Your instructor may change this outline as your class goes along.

Week	Topics	In Textbooks
1	Ratios and Proportions* Teaching Mathematics in the Context of the Reform Movement+ The New York State Common Core Standards for Mathematics	Ch. 7* Ch. 1+ Available online
2	Geometry* Geometric Thinking and Geometric Concepts+ Exploring What It Means to Do Mathematics+ Developing Understanding in Mathematics+	Ch. 10* Sections 1-3 Ch. 20+ pp. 345-368 Ch. 2+ Ch. 3+
3	Geometry* Geometric Thinking and Geometric Concepts+	Ch. 10* Sections 4-5 Ch. 20+ pp. 369-385
4	Geometry of Motion and Change* Technology and School Mathematics+	Ch. 14* Ch. 8+
5	Measurement* Developing Measurement Concepts+ Review for Exam 1 Exam 1	Ch. 11* Sections 1-2 Ch. 19+ pp. 316-332

6	Measurement [*] Developing Measurement Concepts ⁺	Ch. 11 [*] Sections 3-4 Ch. 19 ⁺ pp. 333-344
7	Concepts of Area and Areas of Polygons [*]	Ch. 12 [*] Sections 1-4
8	Area of Polygons and Circles [*] Solid Shapes and Their Volume and Surface Area	Ch. 12 [*] Sections 1-6 Ch. 13 [*] Section 1
9	Functions and Algebra [*] Exploring Functions ⁺ Algebraic Reasoning ⁺	Ch. 9 [*] Ch. 23 ⁺ Ch. 22 ⁺
10	Statistics [*] Exploring Concepts of Data Analysis ⁺ Review for Exam 2 Exam 2	Ch. 15 [*] Ch. 21 ⁺ pp. 386-405
11	Probability [*] Probability ⁺	Ch. 16 [*] Ch. 21 ⁺ pp. 405-415
12	Building Assessment into Instruction ⁺ The New York State Common Core Standards for Mathematics Review for Final Exam	Ch. 5 ⁺ Available online
Finals Week	Final Exam	