Texas A&M University – San Antonio

COLLEGE OF EDUCATION & HUMAN DEVELOPMENT
DEPARTMENT OF CURRICULUM & INSTRUCTION

Math Methods for EC & Elementary Teachers

A. COURSE REQUIREMENTS

No late assignments will be accepted. If work cannot be completed on time, make arrangements with the instructor prior to the due date.

1. Participation & Preparation (Standards I-VIII; *Competencies 001-006*)
2. Tests
   (1) Test 1 (Standards I, V, VI, VII, & VIII; *Competencies 001, 002, & 006*)
   (2) Test 2 (Standards I-VIII; *Competencies 001-004, & 006*)
3. Article Critique (Standard IX; PPR Standard I)
4. Reflection Papers (Standards V-IX; PPR Standards I & III)
   (1) Personal Reflection Paper
   (2) Final Reflection Paper
5. Analyzing Student Work & Re-engagement Strategy
   (Standards I-VIII; Competencies 001-006; PPR Standards I & III)
6. Team Planned Lesson
   (Standards I-VIII; *Competencies 003-004*; PPR Standards I & III)
7. Curriculum Development: Math Story Book Creation
   (Standards I-VIII; *Competencies 001-006*; PPR Standards I & III)
8. Lesson Plan & Microteaching
   (Standards I-VIII; *Competencies 001-006*; PPR Standards I & III)
   (1) Lesson Plan
   (2) Microteaching
   (3) Final Lesson Plan
9. 240 Study Materials & Practice Test #1

B. COURSE GOALS/OBJECTIVES:

After completion of this course, the student should meet the following standards, competencies, and requirements:

TExES Mathematics Generalist EC-6 Standards

Standard I. *Number Concepts:* The mathematics teacher understands and uses numbers, number systems and their structure, operations and algorithms, quantitative reasoning, and technology appropriate to teach the statewide curriculum (Texas Essential Knowledge and Skills [TEKS]) in order to prepare students to use mathematics.

Standard II. *Patterns and Algebra:* The mathematics teacher understands and uses patterns, relations, functions, algebraic reasoning, analysis, and technology appropriate to teach the statewide curriculum (Texas Essential Knowledge and Skills [TEKS]) in order to prepare students to use mathematics.

Standard III. *Geometry and Measurement:* The mathematics teacher understands and uses geometry, spatial reasoning, measurement concepts and principles, and

technology appropriate to teach the statewide curriculum (Texas Essential Knowledge and Skills [TEKS]) in order to prepare students to use mathematics.

Standard IV. *Probability and Statistics:* The mathematics teacher understands and uses probability and statistics, their applications, and technology appropriate to teach the statewide curriculum (Texas Essential Knowledge and Skills [TEKS]) in order to prepare students to use mathematics.

Standard V. *Mathematical Processes:* The mathematics teacher understands and uses mathematical processes to reason mathematically, to solve mathematical problems, to make mathematical connections within and outside of mathematics, and to communicate mathematically.

Standard VI. *Mathematical Perspectives:* The mathematics teacher understands the historical development of mathematical ideas, the interrelationship between society and mathematics, the structure of mathematics, and the evolving nature of mathematics and mathematical knowledge.

Standard VII. *Mathematical Learning and Instruction:* The mathematics teacher understands how children learn and develop mathematical skills, procedures, and concepts, knows typical errors students make, and uses this knowledge to plan, organize, and implement instruction; to meet curriculum goals; and to teach all students to understand and use mathematics.

Standard VIII. *Mathematical Assessment:* The mathematics teacher understands assessment and uses a variety of formal and informal assessment techniques appropriate to the learner on an ongoing basis to monitor and guide instruction and to evaluate and report student progress.

Standard IX. *Professional Development:* The mathematics teacher understands mathematics teaching as a profession, knows the value and rewards of being a reflective practitioner, and realizes the importance of making a lifelong commitment to professional growth and development.

TExES PPR Standards

Standard I. The teacher designs instruction appropriate for all students that reflects an understanding of relevant content and is based on continuous and appropriate assessment.

Standard III. The teacher promotes student learning by providing responsive instruction that makes use of effective communication techniques, instructional strategies that actively engage students in the learning process, and timely, high-quality feedback.

TExES Mathematics Test Competencies (802)

Competency 001 (Mathematics Instruction). The teacher understands how students learn mathematical skills and uses that knowledge to plan, organize and implement instruction and assess learning.

Competency 002 (Number Concepts and Operations). The teacher understands concepts related to numbers, operations and algorithms and the properties of numbers.

Competency 003 (Patterns and Algebra). The teacher understands concepts related to patterns, relations, functions and algebraic reasoning.

Competency 004 (Geometry and Measurement). The teacher understands concepts and principles of geometry and measurement.

Competency 005 (Probability and Statistics). The teacher understands concepts related to probability and statistics and their applications.

Competency 006 (Mathematical Processes). The teacher understands mathematical processes and knows how to reason mathematically, solve mathematical problems and make mathematical connections within and outside of mathematics.

TAC Requirements for Educator Preparation Programs

Educator Preparation Curriculum

(c) (4) the skills that educators are required to possess, the responsibilities that educators are required to accept, and the high expectations for students in this state;

(d) (1) the relevant TEKS, including the English Language Proficiency Standards;

TAC Teacher Standards

(***3) Standard 3--Content Knowledge and Expertise.*** Teachers exhibit a comprehensive understanding of their content, discipline, and related pedagogy as demonstrated through the quality of the design and execution of lessons and their ability to match objectives and activities to relevant state standards.

(A) Teachers understand the major concepts, key themes, multiple perspectives, assumptions, processes of inquiry, structure, and real-world applications of their grade-level and subject-area content.

(i) Teachers have expertise in how their content vertically and horizontally aligns with the grade-level/subject-area continuum, leading to an integrated curriculum across grade levels and content areas.

(ii) Teachers identify gaps in students' knowledge of subject matter and communicate with their leaders and colleagues to ensure that these gaps are adequately addressed across grade levels and subject areas.

(iii) Teachers keep current with developments, new content, new approaches, and changing methods of instructional delivery within their discipline.

(B) Teachers design and execute quality lessons that are consistent with the concepts of their specific discipline, are aligned to state standards, and demonstrate their content expertise.

(i) Teachers organize curriculum to facilitate student understanding of the subject matter.

(ii) Teachers understand, actively anticipate, and adapt instruction to address common misunderstandings and preconceptions.

(iii) Teachers promote literacy and the academic language within the discipline and make discipline-specific language accessible to all learners.

(C) Teachers demonstrate content-specific pedagogy that meets the needs of diverse learners, utilizing engaging instructional materials to connect prior content knowledge to new learning.

(i) Teachers teach both the key content knowledge and the key skills of the discipline.

(ii) Teachers make appropriate and authentic connections across disciplines, subjects, and students' real-world experiences.

TAC Code 228.57 (a)

The educator standards adopted by the State Board for Educator Certification (SBEC) shall be the curricular basis for all educator preparation and, for each certificate, address the relevant ***Texas Essential Knowledge and Skills (TEKS).***

TAC Code 228.57 (d) (4)

The skills and competencies as prescribed in Chapter 235 of this title (relating to Classroom Teacher Certification Standards)
TExES Content Standards

C. Lecture/Discussion Topics:

1. Standards (NCTM & TEKS Standards)
2. Lesson Planning & Assessments
3. Problem Solving
4. Model-Eliciting Activities (MEAs)
5. Storytelling
6. Number Sense
7. Basic Operations
8. Algorithms
9. Algebraic Reasoning
10. Fractions
11. Decimals
12. Measurement & Geometry

13. Probability & Statistics
14. Exponents, Integers, & Real Numbers

D. REQUIRED READINGS/MATERIALS:

Textbook: Van de Walle, J. A., Karp, K. S., and Bay-Williams, J. M. (2019). *Elementary and middle school mathematics: Teaching developmentally,* (10th Ed.). Pearson.

Optional:

Bauer, D., Cezeaux, K., and Scott, J. (2016). *Ultimate guide to the TExES core subjects EC-6: The big yellow book*. Ultimate TExES Guide.

Rosado, L. A. (2014). *TExES Generalist EC-6*. Research & Education Association.

References:

Ball, D. L., Hill, H. C., & Bass, H. (2005). Knowing mathematics for teaching: Who knows mathematics well enough to teach third grade, and how can we decide? *American Educator*, Fall 2005, 14-46.

Ball, D. L., Thames, M. H., & Phelps, G. (2008). Content knowledge for teaching: What makes it special? *Journal of Teacher Education*, *59*(5), 389-407.

Butterworth, S., & Cicero, A. M. L. (2001). Storytelling: Building a mathematics curriculum from the culture of the child. *Teaching Children Mathematics*, *7*(7), 396-399.

Cramer, K. A., Monson, D. S., Wyberg, T., Leavitt, S., & Whitney, S. B. (2009). Models for initial decimal ideas. *Teaching Children Mathematics, 16(*2), 106-117.

Cramer, K., Monson, D., Ahrendt, S., Colum, K., Wiley, B., & Wyberg, T. (2015). 5 Indicators of decimal understandings. *Teaching Children Mathematics*, *22*(3),186-195.

English, L. D. (2008). Introducing complex systems into the mathematics curriculum. *Teaching Children Mathematics*, *15*(1), 38-47.

Kim, Y. R., & Park, M. S. (2018). Effective teaching for place value understanding: A case study of a literacy-integrated math curriculum module. *Early Years*, *39*(1), 19-23.

Shulman, L. S., (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher*, *15*(4), 4-14.