EDUC 315: Teaching Elementary Mathematics

Term: Fall 2026
Credits: 3.0
Lecture Times & Location: Tuesday & Thursday 4:00–5:15 p.m., Lovell Hall 130
Modality: In-Person

Instructor Information

- **Instructor:** Dr. Carmen Montoya (Assistant Professor of Teacher Education)
- **Email:** cmontoya@university.alkimi.ai
- **Office:** Lovell Hall 128
- **Office Hours:**
  - Wednesday & Friday: 1:30–3:00 p.m. (In person, Lovell Hall 128)
  - Tuesday: 11:00 a.m.–12:00 p.m. (Virtual via Zoom; link posted in Canvas)
  - Also available by appointment.

Course Description

Number sense, operations, fractions, geometry, and measurement for grades K–6, with standards-based planning, manipulatives, and student-thinking-centered instruction. EDUC 315 prepares elementary teacher candidates to design and implement standards-based, student-centered mathematics instruction across kindergarten through grade 6. Grounded in the National Council of Teachers of Mathematics (NCTM) Process Standards and state mathematical content domains, candidates investigate early number sense, place value, operations, rational numbers, algebraic thinking, geometry, and measurement. Candidates learn to employ the Concrete-Representational-Abstract (CRA) instructional sequence, utilize physical and digital manipulatives, lead number talks, analyze student misconceptions, and support multilingual learners in developing mathematical discourse.

Prerequisites

Admission to Teacher Education and MATH 105.

Measurable Student Learning Outcomes

Upon successful completion of EDUC 315, students will be able to:

1. **Analyze Mathematical Trajectories in Grades K–6:** Examine learning progressions and standards-based trajectories across early numeracy, whole number computation, fractions, decimals, algebraic reasoning, and geometry.
2. **Implement the Concrete-Representational-Abstract (CRA) Model:** Design mathematics lessons that sequentially bridge concrete manipulatives (e.g., base-ten blocks, fraction strips), visual representations, and abstract symbolic notation.

3. **Conduct Diagnostic Clinical Math Interviews:** Administer an individualized clinical interview to assess an elementary learner's conceptual understanding, diagnosing misconceptions and identifying next instructional steps.
4. **Facilitate Meaningful Mathematical Discourse:** Plan and execute inquiry-based number talks, choral counting, and three-act math tasks that promote math talk, argumentation, and access for bilingual/multilingual learners.
5. **Design a Standards-Based Elementary Mathematics Unit Plan:** Develop a multi-day, differentiated elementary mathematics unit plan featuring formative checks, rich problem-solving tasks, and Universal Design for Learning adaptations.

Required Course Materials & Approximate Costs

1. **Van de Walle, John A., Karen S. Karp, and Jennifer M. Bay-Williams. *Elementary and Middle School Mathematics: Teaching Developmentally*. 10th ed., Pearson, 2019.** Approx. $95 print, $50 digital rental.
2. **National Council of Teachers of Mathematics. *Principles to Actions: Ensuring Mathematical Success for All*. NCTM, 2014.** Approx. $35 print or digital.
3. **Total estimated cost:** $85 to $130.

Generative AI Policy (AI Level 2: AI Permitted with Disclosure for Specified Tasks)

In accordance with Alkimi University Academic Policies (Student Handbook §5.8), EDUC 315 operates under **AI Level 2**.

- **What is permitted:** You may use generative AI tools to brainstorm real-world contexts for elementary word problems, generate variations of mathematical tasks, and proofread draft lesson plan descriptions for grammatical correctness.
- **What is prohibited:** You may not use generative AI to diagnose student mathematical misconceptions in clinical interview assignments, write your comprehensive elementary math unit plan, or complete weekly methodology quizzes. The analysis of student mathematical reasoning must be your own work.
- **Disclosure:** All submitted lesson plans, microteaching reflections, and unit portfolios must include an AI disclosure statement stating which generative AI tools were consulted and how their suggestions were revised or integrated. If no AI tools were used, state: 'No generative AI tools were used in preparing this work.'

Grading Components and Weights

- **Midterm Examination 1:** 15% (In class, Thursday, October 1)
- **Midterm Examination 2:** 15% (In class, Thursday, November 12)
- **Student Mathematical Thinking & Clinical Interview Analysis:** 20% (Due Friday, October 23 at 11:59 p.m.)
- **Number Talk Design & Microteaching Simulation:** 15% (Due Friday, November 20 at 11:59 p.m.)
- **Weekly Math Methods & Manipulative Canvas Quizzes:** 15% (Due Mondays at 11:59 p.m. in Canvas; lowest quiz score dropped)
- **Comprehensive Elementary Mathematics Unit Plan & Portfolio:** 20% (Due by the end of the final exam period, Thursday, December 17, 2026, 3:30–5:30 p.m.)

Grading Scale (Alkimi University Standard)

- **A:** 93–100% | **A-:** 90–92%
- **B+:** 87–89% | **B:** 83–86% | **B-:** 80–82%
- **C+:** 77–79% | **C:** 73–76% | **C-:** 70–72%
- **D+:** 67–69% | **D:** 60–66% | **F:** Below 60%
- **Extra credit:** No individual extra credit assignments are offered in this course.

Course Schedule (Fall 2026)

Week	Dates	Topics & Readings	Assignments & Deadlines
Week 1	Aug 27	**Teaching Mathematics for Understanding:** Relational versus instrumental understanding, NCTM Process Standards, standards for mathematical practice, and creating an equitable math community. *Reading: Van de Walle et al., Ch. 1–2; NCTM, pp. 1–12*	*First day of classes: Wed Aug 26.*
Week 2	Sep 1, 3	**Early Number Concepts and Number Sense:** Subitizing, one-to-one correspondence, cardinality, conservation of number, ten-frames, and dot card routines in kindergarten and grade 1. *Reading: Van de Walle et al., Ch. 8*	*Wed Sep 2: Add/section change deadline.*
Week 3	Sep 8, 10	**Meanings of Operations: Addition and Subtraction:** Cognitively Guided Instruction (CGI) problem types: join, separate, part-part-whole, and compare word problem structures; modeling with counters. *Reading: Van de Walle et al., Ch. 9*	*Mon Sep 7: Labor Day (no classes). Wed Sep 9: Census date (last day to drop without a W).*
Week 4	Sep 15, 17	**Developing Place Value Concepts:** Groupable versus pre-grouped manipulatives (bundles of sticks, base-ten blocks), unitizing, multi-digit decomposing, and mental math strings. *Reading: Van de Walle et al., Ch. 11*	—
Week 5	Sep 22, 24	**Multi-Digit Addition and Subtraction Strategies:** Student-invented strategies, open number lines, partial sums, compensation, and transition to standard algorithms with conceptual transparency. *Reading: Van de Walle et al., Ch. 12*	—
Week 6	Sep 29, Oct 1	**Multiplication and Division Concepts:** Equal groups, arrays, area models, measurement versus fair-share division, and multi-digit multiplication strategies; Midterm Examination 1 in class. *Reading: Van de Walle et al., Ch. 10, 13*	**Midterm Examination 1 (in class).**
Week 7	Oct 6, 8	**Early Algebraic Thinking in Elementary Grades:** Repeating and growing patterns, generalized arithmetic, meaning of the equal sign, balance scales, and relational thinking across K–6. *Reading: Van de Walle et al., Ch. 14*	—
Week 8	Oct 15	**Fraction Concepts: Meanings and Representations:** Area, length, and set models of fractions; partitioning, iterating, unit fractions, equivalent fractions with fraction strips, and number lines. *Reading: Van de Walle et al., Ch. 15*	*Oct 12–Oct 13: Fall break (no classes).*
Week 9	Oct 20, 22	**Fraction Computation and Conceptual Models:** Adding and subtracting fractions with like and unlike denominators, multiplying fractions as taking parts of parts, and division by fractions. *Reading: Van de Walle et al., Ch. 16*	**Student Mathematical Thinking & Clinical Interview Analysis due Fri Oct 23 at 11:59 p.m.**
Week 10	Oct 27, 29	**Decimals, Percentages, and Proportional Reasoning:** Base-ten decimal models, decimal place value, connecting fractions to decimals, percent as hundredths, and qualitative proportional reasoning. *Reading: Van de Walle et al., Ch. 17–18*	—
Week 11	Nov 3, 5	**Measurement Concepts and Geometric Thinking:** Direct and indirect comparison, standard and non-standard units, length, area, perimeter, volume, and Van Hiele levels of geometric thought. *Reading: Van de Walle et al., Ch. 19–20*	*Fri Nov 6: Last day to withdraw (W) or elect Pass/No Pass.*
Week 12	Nov 10, 12	**Data Analysis, Probability, and Graphing in Grades K–6:** Categorical and numerical data displays, picture graphs, bar graphs, dot plots, line plots, and early informal probability; Midterm Examination 2 in class. *Reading: Van de Walle et al., Ch. 21*	**Midterm Examination 2 (in class).**
Week 13	Nov 17, 19	**Supporting Multilingual Learners in Elementary Math:** Mathematical language routines (MLRs), visual representations, bilingual scaffolding, Spanish cognates in math, and fostering	**Number Talk Design & Microteaching Simulation due Fri Nov 20 at 11:59 p.m.**

Week	Dates	Topics & Readings	Assignments & Deadlines
		student voice. *Reading: Van de Walle et al., Ch. 6; selected readings by Dr. Montoya*	
Week 14	Nov 24	**Differentiation, Intervention, and Math Anxiety:** Tiered math tasks, low-floor/high-ceiling problems, addressing math trauma and anxiety, and strengths-based feedback for struggling mathematicians. *Reading: Van de Walle et al., Ch. 7*	*Nov 25–Nov 27: Thanksgiving break (no classes).*
Week 15	Dec 1, 3	**Unit Planning Workshop and Assessment Design:** Aligning learning targets with formative check-ins, performance tasks, and designing rubrics for the comprehensive elementary unit plan. *Reading: Van de Walle et al., Ch. 5*	—
Week 16	Dec 8	**Course Synthesis and Mathematical Identity:** Reflecting on growth as an elementary mathematics educator, professional NCTM resources, and finalizing the unit portfolio. *Reading: Course review packet*	*Wed Dec 9: Last day of classes. Thu Dec 10: Reading Day.*
Finals	Dec 17	**Comprehensive Elementary Mathematics Unit Plan & Portfolio** due by the end of the scheduled final exam period, Thursday, December 17, 2026, 3:30–5:30 p.m.	No final examination.

Course Policies

Attendance Policy

Class attendance and hands-on participation in manipulative workshops and microteaching simulations are essential. Elementary math methods relies upon cooperative peer problem solving and experiential modeling of mathematical concepts. If illness or an emergency prevents attendance, notify Dr. Montoya prior to class. More than two unexcused absences will result in a deduction from your course grade. Students who miss the first two class meetings without notifying the instructor may be dropped. Students may miss class for religious observance without penalty if they notify the instructor in writing within the first two weeks of the semester (by Wednesday, September 9, 2026). Absences for university-sponsored activities (athletics, performances, conferences) are excused with a letter from the sponsoring office at least one week in advance.

Late Work Policy

Assignments submitted after the deadline will lose 10% per calendar day for up to 72 hours. Submissions beyond three days late will not be accepted. Weekly Canvas quizzes must be completed before the posted Monday deadline.

Teacher Education Admission Prerequisite

Enrollment in EDUC 315 requires formal Admission to Teacher Education (including at least 45 earned credits, 2.750 GPA, basic skills exam, and background check) and completion of MATH 105. Teacher candidates must achieve a grade of C+ or higher to progress toward clinical student teaching.

Final Exam Policy

EDUC 315 has no final examination. The comprehensive elementary mathematics unit plan & portfolio takes its place. Nothing is due on Reading Day (Thursday, December 10, 2026).

Academic Integrity

Alkimi University is an academic community devoted to rigorous scholarship, open intellectual inquiry, and uncompromising ethical conduct. All students are subject to the regulations of the Alkimi University Academic Integrity Policy. Academic dishonesty—including plagiarism, cheating on examinations, unauthorized collaboration, fabrication of empirical data, and unauthorized submission of academic work generated by artificial intelligence—undermines the integrity of the university and carries severe disciplinary sanctions. Sanctions range from a failing grade on an assignment or exam to an administrative

course failure recorded as an 'XF' on the official transcript, academic suspension, or expulsion. Suspected violations are formally investigated and resolved through the Office of Academic Integrity in accordance with Faculty Handbook §6. For detailed information, consult the Office of Academic Integrity, Lovell Hall 315, (555) 555-0163, integrity@university.alkimi.ai.

Accessibility Services

Alkimi University is committed to providing equitable educational access and reasonable accommodations for all students with documented disabilities, including physical, sensory, psychological, learning, and chronic health conditions. Students requesting academic accommodations must formally register with the Office of Accessibility Services, Harlan Hall 204, (555) 555-0155, access@university.alkimi.ai. Once approved, students will receive an official Faculty Accommodation Letter detailing approved accommodations. Students should present this letter to the instructor as early in the semester as possible, and at least one week prior to any exam or assignment requiring accommodation. Accommodations cannot be applied retroactively.

Student Wellness and Mental Health

Your physical health, psychological well-being, and mental health are essential to your academic success. If you experience heightened stress, anxiety, depressive symptoms, personal trauma, or academic burnout, free, confidential counseling and medical care are available through the Hollis Health & Counseling Center, located in the Hollis Center. Routine appointments are available Monday–Friday 8:00 a.m.–6:00 p.m. and Saturday 10:00 a.m.–2:00 p.m. during the semester by calling (555) 555-0190 or emailing health@university.alkimi.ai. Urgent, 24/7 crisis psychological counseling is accessible immediately at (555) 555-0199.

Campus Student Support Services

- **Academic Advising Center:** Lovell Hall 101 | (555) 555-0158 | advising@university.alkimi.ai
- **Writing Center:** Whitcombe Library 3rd Floor | Free consultations on papers, reports, and research projects at any stage.
- **Whitcombe Library:** Whitcombe Library, Main Floor | (555) 555-0170 | askalibrarian@university.alkimi.ai
- **Hollis Health & Counseling Center:** Hollis Center | (555) 555-0190 | 24/7 Counseling Line: (555) 555-0199 | health@university.alkimi.ai
- **Elementary Math Curriculum & Manipulative Lab:** Lovell Hall 128 | Hands-on access to math manipulatives, curriculum materials, and lesson planning consultations with Dr. Montoya.