ELED/BED 4310
Teaching Math in Elementary School and Dual Language Classroom
Summer 2015 – Syllabus

University of Texas at El Paso
College of Education, Department of Teacher Education

<table>
<thead>
<tr>
<th>Instructor</th>
<th>Dr. Song An</th>
<th>Email: <a href="mailto:saan@utep.edu">saan@utep.edu</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Class Location</td>
<td>Education Building 201</td>
<td></td>
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<tr>
<td>Office Phone</td>
<td>915-747-7616</td>
<td></td>
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<tr>
<td>Office Location</td>
<td>College of Education (Education Building 808)</td>
<td></td>
</tr>
<tr>
<td>&amp; Office Hours</td>
<td>M &amp; W 4:00 pm– 5:00 pm (Other time by appointment)</td>
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<tr>
<td>Class Time</td>
<td>Monday and Wednesday (5:00pm to 8:00pm)</td>
<td>Online Discussions throughout the semester</td>
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This syllabus is subject to change as needed. Any changes to the syllabus will be announced in class.

Course Description

This course analyzes contemporary curricula; implementation of methods relevant for active, authentic learning, and culture relevant teaching of mathematics to elementary grade learners. Course instruction and activities include opportunities to understand state and national standards related to teaching and learning mathematics. The course will investigate how children learn mathematics and what is meant by deep understanding of mathematics as well as how to teach mathematics so that learners see relationships and connections within and between mathematics ideas. The course will also discuss equity principle and develop conceptual understanding of elementary grade mathematics contents.

Required Textbook


Recommended Resources

1. NCTM Illuminations: http://illuminations.nctm.org/
3. Early Algebra: www.ase.tufts.edu/education/earlyalgebra/default.asp
7. Texas Education Agency (TAKS Released Tests). http://www.tea.state.tx.us/
Course Objectives/Student Learning Outcomes

<table>
<thead>
<tr>
<th>Students enrolled in this section will have multiple academic goals to achieve:</th>
<th>Instructor will use following assessments to evaluate students’ learning outcomes</th>
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| 1. Develop a positive belief in teaching and learning mathematics; understand the role of the teacher as a reflective practitioner. | A. Course graded assignments  
B. Class discussion |
| 2. Design mathematics lessons aligned with the NCTM and TEKS with emphasis of mathematics processes and conceptual understanding | A. Course graded assignments  
B. Lesson observation  
C. Class discussion |
| 3. Identify and use curricular materials and resources that support learner-centered teaching practices. | A. Course graded assignments  
B. Lesson development  
C. Lesson demonstration |
| 4. Create differentiated lessons effective for the diverse mathematics classroom. | A. Lesson demonstration  
B. Class presentations  
C. Lesson observation |
| 5. Explore and develop skills in instructional methods (i.e., use of mathematics manipulatives) appropriate for the teaching and learning of elementary mathematics concepts. | A. Course graded assignments  
B. Final exam  
C. Class discussion and presentation on specific math contents |
| 6. Create assessments appropriate for the Elementary school students | A. Course graded assignments  
B. Class discussions  
C. Final exam |

Attendance, Participation and Professionalism

Attendance of individuals in the class is required and unexcused absences will result in a grade reduction. University rules regarding absences will be followed for the required class meetings. There will be a student sign-in sheet at the beginning of each class. If a student misses a session, it is the responsibility of the student for knowing and completing all work required. Each attendance will count towards the final grade. Two tardies (including early leaves) will count as one absence. More than two absences may result in a student earning one-letter grade lower in the course.

Students are expected that students will attend all classes and actively participate in working on projects and class discussions. Students are expected to prepare for each class session. Lateness to class is strongly discouraged. With the emphasis on collegiality it is important that all group members be in class to contribute to the group’s effort in developing an understanding of what it means to teach mathematics effectively.

All teaching candidates are expected to demonstrate the ethical and professional values associated with Elementary Level Education. It is critical teaching candidates adopt and exhibit a professional demeanor at each point in their teacher preparation. Evidence of professional dedication will be expected through all work during classes and practicum, seminar, internship, and clinical experiences. Credit for participation and professionalism will be part of the evaluation. Wireless phone and tablet usage for irrelevant purposes of the course is strictly prohibited in class.
Assignment Format and Late Assignments

All assignments must be submitted electronically unless specified. It is highly recommended you save all your work electronically and possibly a hardcopy for your records before turning it in. The following format is required for every assignment submitted. Deviating from the format may result in reduced points, returned paper, or rejection of the assignment completely. All assignments should be double spaced and typed with 12-point font; page numbers should be included if more than one pages. You must label your assignment as you save it containing your name and the assignment name. Only assignments submitted complete and on time will be considered for full credit. Without evidence that you were unavailable (sick) for the entire range of days, the assignment will be given a zero. Any assignments turned more than one week late (or the range of dates for submission) will receive zero points.

Standards of Academic Integrity

Students are expected to uphold the highest standards of academic integrity. Any form of scholastic dishonesty is an affront to the pursuit of knowledge and jeopardizes the quality of the degree awarded to all graduates of UTEP. Any student who commits an act of scholastic dishonesty is subject to discipline. Scholastic dishonesty includes, but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are not 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. Proven violations of the detailed regulations, as printed in the Handbook of Operating Procedures (HOP) and available in the Office of the Dean of Students, may result in sanctions ranging from disciplinary probation, to failing grades on the work in question, to failing grades in the course, to suspension or dismissal among others.

Students with Disabilities Statement

If you have or believe you have a disability, you may wish to self-identify. You can do so by providing documentation to the Office of disabled Student Services located in Union E Room 203. Students who have been designated as disabled must reactivate their standing with the Office of Disabled Student Services on a yearly basis. Failure to report to this office will place a student on the inactive list and nullify benefits received. If you have a condition which may affect your ability to exit safely from the premises in an emergency or which may cause an emergency during class, you are encouraged to discuss this in confidence with the instructor and/or the director of Disabled Student Services. You may call 747-5148 for general information about the Americans with Disabilities Act (ADA).

Course Requirement

Attendance and Class Participation

Your active participation in each class session is vital to your learning as well as to the learning of other students in the class. I expect you to attend all class meetings prepared for active, collaborative, participation during the session, whether it is whole group discussion, small group activity, or individual reflection. Preparation for class involves completion of assigned readings and
tasks. If you are unable to attend a particular class session, please let me know beforehand. You are responsible for contacting someone in the class to find out what transpired in your absence. Late work will not be accepted. Make-up quizzes or tests may be scheduled only in the event of documented illness or emergency.

**Assignment 1: Mathematics Teaching Philosophy (No less than 500 words)**

In assignment 1, you will write a short essay about your teaching philosophy. In the essay, you will reflect your mathematics teaching and learning experiences and describe what the most effective mathematics teaching strategies are and why these strategies are effective. For example, you can reflect and evaluate mathematics teaching strategies (such as culturally relevant teaching, inquiry based teaching and/or interdisciplinary teaching) as ways to develop your own mathematics teaching philosophy.

**Assignment 2: TEKS and NCTM Review (No less than 600 words)**

Texas Essential Knowledge & Skills (TEKS) and National Council of Teachers of Mathematics Standards (NCTM) Standards are the two important mathematics standards that all teachers are required to know. You will read both documents and write a review report of the documents. Specifically, (1) you will discuss the structures of each standard for elementary grade levels, and (2) you will also identify and discuss at least one of the key differences between the TEKS and the NCTM standards on a specific content area.

**Assignment 3-5: Teaching Strategy Development**

Select one of mathematics topics (such as fraction, algebra and data analysis), you will develop a series of three mathematics activities based on following three education-entertainment strategies. Teaching strategy development template will be provided.

(1) **Music activity**—you will create original lyrics based on existing kids’ songs, popular or classical music and you will introduce key mathematics vocabulary through the song to students. The lyrics has different verse sessions and chorus sessions, the lyrics should be no less than 150 words without repetition.

(2) **Arts activity**—you will create original graphic novels with storylines based on mathematics concepts and you will introduce key mathematics vocabulary through the story and pictures to students; The graphic novel should has at least 6 pictures and the story should be no less than 200 words.

(3) **Dancing activity**—you will choreograph original dance to introduce mathematical concepts to students. The dance (solo, partner, or group dance) should contain at least 16 different movements. Based on the dancing activities you will design mathematics exploration tasks for students to learn mathematics. The description of the mathematics task should be no less than 100 words.

Specifically, in assignment 3, you will develop a series of 3 mathematics activities (a music activity, an art activity and a dancing activity) for K-2 grade students; in assignment 4, you will develop a series of 3 mathematics activities for 3-4 grade students; and in assignment 5, you will develop a series of 3 mathematics activities for 5-6 grade students.
Activity Demonstration

Working independently, you demonstrate a series of three mathematics activities (for a specific grade level) that you designed in assignment 3-5. The demonstration should be around 10 minutes in length. In the activity demonstration, you will show and sing one of the lyrics you created, show the graphic novel and tell the story that you created and show a dance that you choreographed as well as introduce the mathematics tasks you designed to your classmates.

Take Home Final Exam

At the end of the semester, you will have a take home exam, and the exam will cover teacher certification tests contents, class discussions, assignments, activities, and readings. The exam questions can be found in the Blackboard, and you will prepare your answers in a word file and submit it through the Blackboard.

Assignments and Grades

| Assignment 1 | (10 Pts) | (Week 1) |
| Assignment 2 | (10 Pts) | (Week 1) |
| Assignment 3 | (10 Pts) | (Week 2) |
| Assignment 4 | (10 Pts) | (Week 3) |
| Assignment 5 | (10 Pts) | (Week 4) |
| Take Home Final Exam | (30 Pts) | (Week 4) |
| Activity Demonstration | (20 Pts) | (Week 4) |
| **Total** | **100 Pts** |

Grade Distribution:

- A 90% - 100% of point total
- B 80% - 89.9% of point total
- C 70% - 79.9% of point total
- D 60% - 69.9% of point total

**General Calendar**

*Changes may be made in this syllabus when judged appropriate by the instructor*

<table>
<thead>
<tr>
<th>Dates</th>
<th>Class Topics/Activities</th>
<th>Assignments and Due dates</th>
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| Week 1 | Chapter 1-7 | Assignment 1  
June 8 | Foundation of Math Teaching  | Due June 11 |
| Week 1 | Chapter 8-9 | Assignment 2  
June 10 | Number Concepts  | Due June 14 |
| Week 2 | Chapter 10-13 | Assignment 3  
June 15 | Number Operation  |
| Week 2 | Chapter 19 & 20 | Assignment 3  
June 17 | Geometry & Measurement  | Due June 20 |
| Week 3 | Chapter 14 & 18 | Assignment 4  
June 22 | Algebra and Proportion  | Due June 25 |
| Week 3 | Chapter 21 & 22 | Assignment 4  
June 24 | Data Analysis & Probability  | Due June 25 |
| Week 4 | Chapter 15-17 | Assignment 5  
June 29 | Fraction and Decimal  | Due June 30 |
| Week 4 | Lesson Demonstrations | Assignment 5  
July 1 |  | Due June 30 |
**Kindergarten Math Vocabulary**

**Counting & Cardinality**

**Comparison:** big, equal, more, between, less, before, after, opposite, small, compare  
**Counting:** hundred, count forward, even, number, odd, numeral, quantity, small, big  
**Grouping:** pair, table, add, equal, ten, one, count forward, tally, group  
**Money:** coin, money, cent, penny, dime, quarter, count, dollar, nickel  
**Sequence:** fourth, fourth, number line, sequence, order, tens, ones, even numbers, odd numbers

**Algebraic Thinking**

**Operations & Algebraic Thinking:** different, alike, input, output, sort, outside, object, match, size, similar

**Base Ten Operations**

**Number & Operations in Base Ten:** minus, value, behind, sum, above, difference, add, compare, zero, below, subtract, under, ones, tens, beside, between, addition, sort

**Measurement & Data**

**Measurement & Data:** measure, long, estimate, longest, shorter, small, size, big, short, biggest, today, time, minute, calendar, hour, second, yesterday, morning, afternoon, date, minute hand, first, second hand, hour hand, clock, year, equal parts, month, day, week

**Geometry**

**Geometry:** square, shapes, pattern, triangle, rectangle, cylinder, halves, cone, in front of, cube, inside, middle, sphere, corner, curves, slide, right, graph, circle, left
First Grade Math Vocabulary

Algebraic Thinking

Operations & Algebraic Thinking: alike, similar, object, match, size, output, sort, input, different

Base Ten Operations

Number & Operations in Base Ten - Graphing/Units: data, non-standard unit, horizontal, vertical, standard unit, graph, estimate, symbol, sort, group
Number & Operations in Base Ten - Counting: skip-counting, count, numeral, even, odd, whole number, pattern, integer
Number & Operations in Base Ten - Comparison: compare, less, equal, near, less than, more than, half, opposite, before, after
Number & Operations in Base Ten - Sequence: order, number line, pattern, number, more, rule, less, sequence, sort
Number & Operations in Base Ten - Operations: solve, addition, total, add, numeral, subtraction, equals, operation, minus, less, more, number sentence, sum, subtract, plus, difference
Number & Operations in Base Ten - Place Value: half, place value, fourth, double, whole, tens, ones, digit
Number & Operations in Base Ten - Digits: digit, count, zero, ten, one, hundred, thousand, whole number, integer

Measurement & Data

Calendar: month, calendar, day, week, year, leap year, season
Graphing: chart, picture graph, bar graph, input, measurement, table, data
Length/Temperature: measure, length, foot, ruler, long, inch, shorter, thermometer, temperature
Money: money, dollar, coin, cent, half-dollar, quarter, nickel, penny, dime, currency
Statistics: less likely, impossible, equally likely, tally, certain, equal parts, estimate, even, chance
Time: time, second, hour hand, minute, second hand, half-hour, clock, first, hour, minute hand
Weight/Volume: measure, gram, scales, cup, pint, quart, pound, size, balance, kilogram

Geometry

Description: size, longer, small, longest, smallest, intersect, characteristics, side, parallel, describe
Direction: corner, slide, curves, turn, right, above, below, left, direction, line
Location: location, in front of, between, under, inside, outside, behind, middle, over
Prisms: geometry, prism, line of symmetry, sphere, cylinder, cube, three dimensional, fourths, halves, cone
Shapes: geometry, rectangular, line of symmetry, circle, square, triangle, shape, rectangle, two dimensional, sides
Second Grade Math Vocabulary

Algebraic Thinking

Operations & Algebraic Thinking: sort, alike, commutative property, expanded form, match, unknown, size, different, associative property, similar

Base Ten Operations

Number & Operations in Base Ten - Comparison: small, greatest, near, after, more than, smallest, equal, compare, whole number, integer
Number & Operations in Base Ten - Counting: count forward, number line, sequence, skip-counting, odd, pattern, numeral, even
Number & Operations in Base Ten - Grouping: group, regroup, estimate, rule, pattern, fact family, length, classification
Number & Operations in Base Ten - Numbers: hundred, one, ordinal number, zero, cardinal number, number line, ten, odd, even, sequence
Number & Operations in Base Ten - Operations: sum, addition, subtraction, difference, number sentence, minus, plus, solve, numeral, operation
Number & Operations in Base Ten - Place Value: tens, hundreds, fourths, halves, half, double, ones, thirds, digit, part

Measurement & Data

Calendar: date, day, week, calendar, month, event, leap year, season
Fractions: equivalent, extend, whole, equal parts, ones, tens, one-third, one-fourth, fraction, integer
Length: foot, temperature, thermometer, longest, centimeter, inch, meter, yard, length, degree
Money: coin, dollar, money, dime, nickel, quarter, penny, half-dollar, cent, currency
Showing Data: symbol, table, bar graph, interpret, pie chart, tally, picture graph, data
Statistics: estimate, survey, predict, unlikely, likely, equal, outcome, equally likely, impossible, certain
Time: time, second, minute hand, hour, elapsed time, quarter-hour, minute, hour hand, half-hour, second hand
Weight/Volume: gram, balance, cup, quart, pint, pound, kilogram, liter, size, ounce

Geometry

Classification: reflect, set, slide, rotate, measure, turn, angle, column
Description: right, rectangular, perimeter, distance, circular, corner, below, beside, above, left
Prisms: cube, cone, prism, cylinder, face, line of symmetry, dimensions, sphere, three dimensional
Shapes: pentagon, shape, sides, square, triangle, trapezoid, circle, rectangle, symmetry, polygon, parallelogram, plane shapes, hexagon, octagon, two-dimensional, line of symmetry, intersect, geometry, quadrilateral, parallel
# Third Grade Math Vocabulary

**Algebraic Thinking**

**Operations & Algebraic Thinking:** solution, range, inequality, domain, form, distributive, like denominator, expression, multiples, equation

**Base Ten Operations**

**Number & Operations in Base Ten:** regroup, place value, whole numbers, minuend, rounding, division, estimation, solution, addend, number line, subtraction, digit, product multiplier, addition, plus, minus, difference, sum, times

**Fractions**

**Number & Operations - Fractions:** divisor, numerator, factor, fraction, dividend, relative, whole number, quotient, denominator, rounding

**Measurement & Data**

**Length:** centimeter, area, length, height, mile, kilometer, temperature, perimeter, meter, width

**Showing Data:** tally chart, bar graph, data, input, interpret, pictograph, customary units, non-standard units, picture graph, table, symbol

**Statistics:** chance, reasonableness, median, data, input, outcome, combinations, mode, predict

**Time/Temperature:** thermometer, degrees, second, minute, clockwise, counterclockwise, temperature, elapsed time, hour, Celsius

**Weight/Volume:** gram, liter, weight, scale, metric, liquid measures, kilogram, ounce, capacity, volume

**Geometry**

**Angles:** obtuse angle, angle, acute angle, right angle, straight angle, vertex, perpendicular, reflection, congruent, degrees

**Lines:** side, coordinates, line graph, right angle, line of symmetry, intersecting lines, closed figure, line segment, perpendicular, degrees

**Prisms:** cube, cylinder, base, cone, face, sphere, prism, solid figure, dimensions, volume

**Shapes:** polygon, octagon, symmetry, congruent, translation, pentagon, hexagon, rhombus, parallelogram, area
Fourth Grade Math Vocabulary

Algebraic Thinking

**Operations & Algebraic Thinking:** variable, inequality, equivalent, differences, factor, equation, product, comparison, expression, similarity, inequality, relationship, similarity, comparison, differences, factor, equation, variable, extraneous, equivalent

Base Ten Operations

**Number & Operations in Base Ten:** comparison, equation, relationship, equivalent, inequality, factor, rounding, regroup, variable, similarity, size, inverse operation, gram, calculate, compare, composite number, million, decimal number, simplify, relative, addend, product, symmetry, centimeter, fahrenheit, celsius, differences, polyhedron, extraneous, estimation

Fractions

**Number & Operations - Fractions:** proper fraction, percent, consecutive, common fraction, ordinal number, factor, multiples, improper fraction, mixed number, fraction, compare, dividend, denominator, remainder, divisor, quotient, more than, numerator, less than, equivalent

Measurement & Data

**Units & Coordinates:** y-axis, line graph, customary units, non-standard units, x-axis, coordinates, coordinate, system, data, unit conversion, unit

**Length:** meter, length, width, kilometer, measurement, inch, yard, centimeter, metric, foot

**Problem Solving:** probability, predict, array, survey, chance, likely, unlikely, certainty, data collection, tendency

**Quantity/Size:** volume, liter, ounce, pint, kilogram, weight, mass, quart, gallon, balance

**Time/Temperature:** Celsius, Fahrenheit, measurement, minute, second, event, degree, time, temperature, hour

**Interpretation:** mean, median, mode, range, likelihood, ordered pairs, statistics, interpret, graph, data

**Presentation:** tree diagram, pie chart, diagram, data, circle graph, Venn diagram, tally, bar graph, frequency table, measure

Geometry

**Angles:** congruent, acute angle, obtuse angle, rotate, straight angle, degrees, angle, right angle, triangle, perpendicular

**Classification:** similarity, translation, congruent, reflection, rectangular, symmetry, closed figure, open figure, rotation, transformation

**Lines:** intersection, perpendicular, length, line segment, circumference, point, distance, grid, side, line of symmetry

**Measurement:** square unit, area, capacity, degrees, distance, grid, radii, height, diameter, length

**Polygons:** polygon, pentagon, quadrilateral, hexagon, rhombus, pentagon, parallelogram, plane figure, octagon, polyhedron

**Prisms:** prism, base, face, solid, sphere, horizontal, parallel lines, cube, cylinder, cone
Fifth Grade Math Vocabulary

Algebraic Thinking

Operations & Algebraic Thinking: equivalent, inequality, pattern, variable, expression, order of operations, evaluate, equation, forms, relationship, factoring, pair, squared, coefficient, solution, square root, inverse, vertices, exponent, point, braces, sequence, symbol, ordered pairs, rule, coordinate plane, parentheses, numerical expression, numerical pattern, brackets

Base Ten Operations

Number & Operations in Base Ten: decimal number, divisible, digit, dividend, billion, operation, natural numbers, consecutive, cardinal number, calculate, sum, product, multiplicand, percent, subtractend, estimation, million, difference, quotient, prime number

Fractions

Number & Operations - Fractions: prime factorization, ordinal number, least common multiple, divisible, reduce, equivalent, remainder, divisor quotient, simplify, whole, percent, half, estimation, quarter, ratio, part, greatest common factor, fraction, dividend

Measurement & Data

Units & Coordinates: units of measure, unit conversion, coordinates, plot, unit, square unit, cubic units, y-axis, x-axis, coordinate system
Data Collection: data collection, unorganized data, arrangement, input, labels, increments, location, survey, data, organize
Measurement: Celsius, Fahrenheit, mass, quantity, scale, capacity, volume, estimate, measure, area
Problem Solving: predict, likely, probability, certainty, verify, less likely, collection, chosen, array, analysis
Interpretation: interpret, mean, ratio, bar graph, data, median, mode, line graph, circle graph, pie chart
Representation: randomly, function, stem and leaf plot, diagram, grid, scale, Venn diagram, double-bar graph, tree diagram, data

Geometry

Angles: semicircle, acute angle, obtuse angle, perpendicular, degrees, congruent, right angle, straight angle, parallel lines, line
Lines: coordinates, diameter, distance, line of symmetry, intersection, side, diagonal, line segment, horizontal, vertical
Measurement: diameter, circumference, radius, horizontal, turn, translation, reflection, transformation, rotation, symmetry
Shapes: semicircle, rectangular, trapezoid, two-dimensional, tessellation, quadrilateral, symmetry, parallelogram, polygon, prism
Sixth Grade Math Vocabulary

Ratios & Proportions

**Ratios & Proportional Relationships**: cubic, kilometer, Fahrenheit, volume, centiliter, capacity, weight, temperature, velocity, quantity

The Number System

**The Number System**: composite, cardinal number, consecutive, greatest common factor, natural numbers, reducing, inverse operation, prime factorization, least common multiple, quotient

Expressions & Equations

**Expressions & Equations**: radicand, coefficient, rational expression, quadratic formula, real number, monomial, variable, polynomial, binomial, equation, power, equivalent, expression, simplify, inequality, symbol, order of operations, constant, exponent, factoring

Statistics & Probability

**Statistics & Probability**: graph, ratio, event, certainty, location, experimental probability, scale, collection, input, grid, likelihood, mean, mode, increments, Venn diagram, random, median, survey, predict, intervals

Geometry

**Modelling**: integers, acute, cartesian coordinate, inequality theorem, pyramid, simulation, equilateral, prism, geometry, model, rational number

**Lines**: polygon, similar, line segment, circumference, intersection, equilateral, ray, arc, diagonal, radius

**Transformation**: translation, symmetry, quadrilateral, tessellation, vertices, horizontal, vertical, supplementary, transformation, rotation

**Angles**: interior angles, exterior angles, scalene, equiangular, protractor, obtuse, acute, parallel, perpendicular, degrees