Class meeting time: 6:00 pm - 8:50 pm, Mondays, Educ. 402. Location: face-to-face sessions will be meeting in Educ. 402, online sessions will be conducted via Blackboard.

**Instructor Contact Information:**
**Dr. Kosheleva**, Department of Teacher Education  
**Office:** Educ. 607  
**Phone:** 747-7588  
**E-mail:** olgak@utep.edu  
**Office Hours:** Mondays, 4:45 – 6:00 pm, 8:50 – 9:50 pm, Educ. 402, or by appointment.

**Required Readings and other resources:**
Journal articles posted on course Blackboard

Test Framework for Field 115: Mathematics 4-8 (posted on course Blackboard, also in Appendix 1)  

Test Framework for Field 114: Mathematics/Science 4-8 (posted on course Blackboard)  

**Other materials/resources we will be using:**

- This website includes resources for revised Texas Essential Knowledge and Skills (TEKS) for all grade levels (Mathematics).  
http://tea.texas.gov/Curriculum_and_Instructional_Programs/Subject_Areas/Mathematics/Resources_for_the_Revised_Kindergarten_%E2%80%93_Grade_8_Mathematics_TEKS/  
http://www.projectsharetexas.org/resource/revised-mathematics-teksside-side-tekscolor-printable  
http://ritter.tea.state.tx.us/rules/tac/chapter111/index.html

- Texas College Readiness Standards  
http://www.thecb.state.tx.us/collegereadiness/CRS.pdf

- Common Core Standards  
http://www.corestandards.org/

- National Council for Teachers of Mathematics (NCTM)  
http://www.nctm.org/  
http://standardtrial.nctm.org/triallogin.asp  

MTED3330 Syllabus Monday Fall 2015 – Dr. O. Kosheleva
NCTM Curriculum Focal Points

https://www2.bc.edu/solomon-friedberg/mt190/nctm-focal-points.pdf

• This website provides a wide selection of virtual manipulatives for teaching mathematics:
  http://nlvm.usu.edu/en/nav/vlibrary.html

• Book "Measuring What Counts: A Conceptual Guide for Mathematics Assessment"
  http://www.nap.edu/catalog.php?record_id=2235

• Book "Measuring Up: Prototypes for Mathematics Assessment"
  http://www.nap.edu/catalog.php?record_id=2071

• Book "Knowing What Students Know: The Science and Design of Educational Assessment"
  http://www.nap.edu/catalog.php?record_id=10019

• Book "How Students Learn: Mathematics in the Classroom". You can read it online at
  http://www.nap.edu/catalog.php?record_id=11101

• Book "Adding It Up: Helping Children Learn Mathematics". You can read it online at
  http://books.nap.edu/books/0309069955/html/

  • Book "High School Mathematics at Work"
    http://www.nap.edu/openbook.php?isbn=0309063531

  • Dana Center website. This site provides great ideas for teaching mathematics.
    http://www.utdanacenter.org

• Critical Issues in Assessment
  http://www.ncrel.org/sdrs/areas/as0cont.htm

• Critical Issue: Providing Hands-On, Minds-On, and Authentic Learning Experiences in Mathematics
  http://www.ncrel.org/sdrs/areas/issues/content/cntareas/math/ma300.htm

• The Trends in International Mathematics and Science Study - is a world-wide assessment and research project that conducts mathematics and science assessments to 4th and 8th grade students from more than 60 counties including the United States every four years.

  http://timssandpirls.bc.edu/

  http://timssvideo.com
• These websites describe different aspects of math representations

  http://mtc.tamu.edu/home.htm?intro-pre.htm

  http://www.learner.org/courses/teachingmath/

  http://www.abstractmath.org/MM/MMRepsModels.htm

  http://en.wikipedia.org/wiki/Multiple_representations_%28mathematics_education%29

  http://www.pictorialmath.com/Home.html


  http://www.losmedanos.edu/deved/documents/m25_student_work.multiple_representations_000.pdf

  http://ctlonline.org/blog/?p=357

• These websites provide a wide selection of virtual manipulatives interactive games for teaching mathematics:

  http://nlvm.usu.edu/en/nav/vlibrary.html

  http://www.shodor.org/interactivate/activities/

  http://www.fi.uu.nl/rekenweb/en/


• Math Activities and Blackline Masters

  http://www.ixl.com/?gclid=CMWO9Z3i6KoCFZYYb2godPmnQOw

  http://wps.ablongman.com/ab_vandewalle_math_6/

**Materials:** You will need to bring to each class session name tag, a good compass, ruler, and protractor. Other things that might be useful: calculator, graph paper, poster board, colored pens, scissors and tape.

**Course Philosophy**

"Teaching is a lifelong art that ... involves continuous learning not just for the student but for the teacher as well." -- Joseph Katz and Mildred Henry

For teachers of mathematics to be truly effective involves bringing together four basic components:

  (a) An appreciation of the discipline of mathematics itself, (b) An understanding how students learn and construct ideas, (c) An ability to design and select challenging tasks, create problem-solving environment, (d) The ability to integrate appropriate, mathematically meaningful assessment with the teaching process.

One of the main components of teaching is helping children to “discover” mathematics for themselves by creating successful learning environment, friendly atmosphere, and “open mind” approach. The goal of mathematical training is not only to find the correct answer, but to find it using the "best" method; hence teacher needs to promote students' thinking, to encourage searching for different methods leading to the same answer; When a mistake is made in one of the methods, the other methods will help children to arrive to correct answer, so it is very important not to give children the right answer, but allow them to arrive to it, may be through a
sequence of mistakes, and corrections of the mistakes. Children should get a lot of practice in solving a variety of problems; the role of teacher is to select the true variety, to engage children by posing challenging problems and encouraging students to creatively invent new ways of approaching the problem without fear of making a mistake.

This course has been constructed to help you in critically examining the philosophies, theories, research, pedagogical techniques and materials associated with effective learning and teaching in the mathematics classrooms.

**Course Objectives:**

- Explore innovative learning theories and techniques of teaching and learning mathematics: using multiple connections and representations, problem-based, inquiry, open-ended approaches.
- Study how to apply general and content methods of teaching and learning K-12 mathematics in diverse classroom settings.
- Help the students to create successful learning environment in teaching and learning of secondary mathematics.
- Explore the relationship between “hands-on” (learning) and “minds-on” (cognition) in understanding mathematics concepts.

**Understanding Representations**

“The term representation refers both to process and to product—in other words, to the act of capturing a mathematical concept or relationship in some form and to the form itself. … “

“All forms of representation—such as diagrams, graphical displays, and symbolic expressions—have long been part of school mathematics…."

“Representations should be treated as essential elements in supporting students' understanding of mathematical concepts and relationships; in communicating mathematical approaches, arguments, and understandings to one's self and to others; in recognizing connections among related mathematical concepts; and in applying mathematics to realistic problem situations through modeling. New forms of representation associated with electronic technology create a need for even greater instructional attention to representation.” (NCTM, Representation Standard).

**Course Structure:**

Each face-to-face class session will consist of a brief lecture and/or students’ interactive discussion/presentation, and problem solving activities. The discussion will focus on how the lessons exemplify the given standard, on how to assess the effectiveness of a lesson, and on modifications and improvements. You will be required to take notes during each class session.

During online sessions you will be asked to read mathematics education papers and chapters from the book, write reflections and participate in online discussion (all these activities will be conducted via Blackboard).

**Course Requirements and Assignments**

- Each attendance and participation (with positive attitude) will count towards final grade. It will be taken each meeting using a sign-in sheet (which is your responsibility to make sure you sign); sometimes you will be asked to sign in the beginning of class session, and at the end of class session.
Your active participation and positive attitude towards learning innovative ideas about mathematical pedagogy in each class session is vital to your learning as well as to the learning of other students in the class. The instructor may count late arrival, early departure, or blatant nonparticipation as a half-absence or even a full absence, depending on what is missed. We meet only once a week and most of the activities in this course involve collaborative learning, group activities or discussions. Students may miss a total of two classes, and these absences may be excused and/or unexcused absences. Each absence will affect your grade.

I hold the right to drop a student from a course after two absences.

The official UTEP attendance policy for undergraduate students is as follows:

“The student is expected to attend all classes and laboratory sessions. It is the responsibility of the student to inform each instructor of extended absences. When, however, in the judgment of the instructor, a student has been absent to such a degree as to impair his or her status relative to credit for the course, the instructor may drop the student from the class with a grade of “W” before the course drop deadline and with a grade of “F” after the course drop deadline.” (UTEP Undergraduate Catalog).

- Assigned readings are a vital aspect of the course. You will be asked to write reflections on your readings, research and create your own math activities using manipulatives and technology.
- During some sessions quizzes on assigned readings will be conducted.
- You will be asked to take reflection notes during or after each class session.
- There will be several comprehensive exams and ongoing group/individual presentations.
- We will be using Electronic Databases from UTEP Library on a continuous basis. Make sure to become familiar with this wonderful resource. Part of every assignment will include some relevant search in Electronic Database.
- Organizing/facilitating interactive Discussions/Presentation.
  Each group will be prepared to facilitate interactive discussions with students from the class. You will present the selected chapter and your Meta lesson using interactive activities. Your role is to be "peer leaders", that is while other students work in small groups, you will be providing content activities, and will help to maintain and encourage student interest and focus on conceptual understanding through a Socratic questioning dialog. You should also promote interaction within and among groups participated in content activities. The ultimate goal: by participating in hands-on activities, students will be actively constructing their own knowledge and deepen their understanding of mathematical concepts and procedures (group work).
  Extra Credit: you will have many opportunities to receive extra credit, e.g., you will be invited to participate in service learning, tutoring, participate in College of Education focus groups, surveys, conferences etc.

The main criteria for evaluation of the organization and conduct of interactive Discussions/Presentations are following:

1. Content Activities design: Your content activities should correspond to assigned topic. The activities could be enhanced by your own ideas, examples from mathematics teaching observation, ideas from other resources (please, provide proper references for all the resources you will be using) (10%)
2. **Content Area Knowledge**: Group members should be confident in the mathematics content area. They should be aware of various approaches addressing solution of the concept-related questions, and be able to respond to various questions accurately, appropriate authentic assessment (30%)

3. **Level of challenge**: Content activities should motivate students’ learning and address creativity, critical and high-order thinking skills development (10%)

4. **Level of class involvement**: You should demonstrate good communication skills, encourage students to share their ideas, and orchestrate the whole class discussion. Specifically, questions from other students and professor should be encouraged during the whole presentation (not just at the end). Number of questions asked, and answers provided would be one of the main criteria for evaluation (20%)

5. **Level of instructional materials preparation and application**: The use of a variety of instructional materials including manipulatives, visuals, and technology tools (10%)

6. **Written report (activities, transcript/description of discussion questions, etc.)** (20%)

**Student Learning Outcomes**

The course’s learning outcomes will require the student to acquire throughout the semester new knowledge and skills and build upon them. The following table provides a list of the most relevant student learning outcomes for the course. The following outcomes are aligned with SBEC-approved Texas educator standards.

These outcomes are also aligned with NCTM Representation Standard that states the following:

Instructional programs from prekindergarten through grade 12 should enable all students to—

- create and use representations to organize, record, and communicate mathematical ideas;
- select, apply, and translate among mathematical representations to solve problems;
- use representations to model and interpret physical, social, and mathematical phenomena.

**Table 1. Student learning outcomes and assessment**

<table>
<thead>
<tr>
<th>Student Learning Outcomes</th>
<th>Assessments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>By the end of course, the successful student will be able to:</strong></td>
<td><strong>To evaluate these outcomes, the faculty member will use the following assessment procedures:</strong></td>
</tr>
<tr>
<td>1. Develop an understanding of current issues, practices and directions in mathematics curriculum and the ability to inquire into these.</td>
<td>a. Class interactive discussions and b. Quizzes and exams.</td>
</tr>
<tr>
<td>2. Develop knowledge and skills in educational research.</td>
<td>a. Class interactive discussions/presentations and b. Quizzes and exams.</td>
</tr>
</tbody>
</table>
| 3. Identify and analyze topics of importance in current mathematical education. | a. Class interactive discussions/presentations.
| | b. Quizzes and exams and c. Graded Electronic Databases Literature searches. |
| 4. Deepen their commitment to their pupils’ learning of mathematics. | a. Pre/Post-Test. |
| 5. Increase their confidence to teach mathematics. | a. Pre/Post-Test. |
| 6. Improve their ability to manage and assess | a. Class interactive discussions/presentations |
their pupils’ mathematics learning. 
Discover innovative methods of instruction to increase effectiveness and pupils’ engagement, learning, and thinking.

| 7. Improve their capacity to think reflectively and creatively about their teaching of mathematics. | a. Class interactive discussions/presentations 
b. Quizzes and exams and 
c. Pre/Post-Test. |
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>8. Increase their capacity to become an agent of change in the field of mathematics education.</td>
<td>a. Pre/Post-Test.</td>
</tr>
</tbody>
</table>
| 9. Develop knowledge and strategies to design curriculum at classroom and school levels. | a. Class interactive discussions/presentations 
b. Quizzes and exams and 
c. Pre/Post-Test. |

**Assessment and Grading:**

Your grade will be determined by the level of you fulfilling the following requirements.

There are five benchmarks for this course. Your success in fulfilling these benchmarks will determine your grade for the course:

Grade "A": Student meets all the requirements, completes all assignments, and turns in all assignments (including tests) on time. The average grade for assignments (including all extra credit) and tests is A.

Grade "B": Student meets all the requirements, but does not complete all assignments, submits some assignments after the due date, has excessive absences. The average grade for assignments (including all extra credit) and tests is B.

Grade "C": Student does not meet all of the benchmarks, does not complete all assignments, submits most assignments after the due date, and has excessive absences. The average grade for assignments (including all extra credit) and tests is C.

Each month cumulative grade for that month will be provided.

**Requirements for course success:**

1. You should become an expert in working with UTEP Library electronic database.
2. You should become knowledgeable and proficient in working with Blackboard.
3. You will work as a cooperative member of the community of learners that comprises this class.

**Grade Distribution**

| Active Participation/Positive Attitude | 28 |
| Reflections/Quizzes | 24 |
| Presentations/ Interactive Discussions | 24 |
Students with Disabilities
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).

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.

Participants are expected to abide by the UTEP policies concerning academic honesty. Specifically:

Academic dishonesty is prohibited and is considered a violation of the UTEP Handbook of Operating Procedures. It includes, but is not limited to, cheating, plagiarism, and collusion. Cheating may involve copying from or providing information to another student, possessing unauthorized materials during a test, or falsifying research data on laboratory reports. Plagiarism occurs when someone intentionally or knowingly represents the words or ideas of another person’s as ones’ own. And, collusion involves collaborating with another person to commit any academically dishonest act. Any act of academic dishonesty attempted by a UTEP student is unacceptable and will not be tolerated. Violations will be taken seriously and will be referred to the Dean of Students Office for possible disciplinary action. Students may be suspended or expelled from UTEP for such actions.

(Source: http://cetalweb.utep.edu/sun/cetal/events/docs/Academic_Dishonesty.htm).

The course instructor reserves the right to adjust the course syllabus or change assignments as needed.
## Table 2. Tentative Course Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Assignment</th>
<th>Submissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aug 24</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>F2F</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 2</td>
<td>Introduction and Syllabus Discussion. BlackBoard introduction. Hands-on activity. Presentation on UTEP electronic databases. Group presentations assignment.</td>
<td>Specific instructions (if available) will be posted in BB, Discussion Forum “Week 2”.</td>
</tr>
<tr>
<td>Aug 31</td>
<td></td>
<td></td>
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<tr>
<td><strong>F2F</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sep 7</td>
<td>Labor Day. No class.</td>
<td></td>
</tr>
<tr>
<td>Week 3,</td>
<td>Group presentations on UTEP electronic databases searches related to fractions, ratios, proportions and place value.</td>
<td></td>
</tr>
<tr>
<td>Sep 14,</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>F2F</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 4</td>
<td>Hands-on activity. Group presentations on UTEP electronic databases searches. Focus on Number Sense. Group presentations assignment.</td>
<td>Specific instructions (if available) will be posted in BB, Discussion Forum “Week 4”.</td>
</tr>
<tr>
<td>Sep 21,</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>F2F</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 5</td>
<td>Hands-on activity. Group presentations on UTEP electronic databases searches.</td>
<td>Specific instructions (if available) will be posted in BB, Discussion Forum “Week 5”.</td>
</tr>
<tr>
<td>Sep 28</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>F2F</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 6</td>
<td>Hands-on activity. Group presentations on UTEP electronic databases searches. Focus on Number Sense, Place Value.</td>
<td>Specific instructions (if available) will be posted in BB, Discussion Forum “Week 6”.</td>
</tr>
<tr>
<td>Oct 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>F2F</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 7</td>
<td>Take-Home Midterm</td>
<td>BB submission is required. Specific instructions will be posted in BB, Discussion Forum “Week 7”.</td>
</tr>
<tr>
<td>Oct 12</td>
<td></td>
<td><strong>Due: 10/18/2015, 11 pm MT</strong></td>
</tr>
<tr>
<td><strong>ONLINE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 8</td>
<td>Reading #1 (see instructions about reading materials and reflection submission on Discussion Folder “Reading #1”).</td>
<td>BB submission is required. Specific instructions will be posted in BB, Discussion Forum “Week 7”.</td>
</tr>
<tr>
<td>Oct 19</td>
<td></td>
<td><strong>Due: 10/25/2014, 11 pm MT</strong></td>
</tr>
<tr>
<td><strong>ONLINE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 9</td>
<td>Hands-on activity. Group presentations on UTEP electronic databases searches. Focus on Number Sense/Fraction Number Sense.</td>
<td>Specific instructions (if available) will be posted in BB, Discussion Forum “Week 9”.</td>
</tr>
<tr>
<td>Oct 26</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>F2F</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 10,</td>
<td>Hands-on activity. Group presentations on UTEP electronic databases searches.</td>
<td>Specific instructions (if available) will be posted in BB, Discussion Forum “Week 10”.</td>
</tr>
<tr>
<td>Nov 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>F2F</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 11</td>
<td>Hands-on activity. Group presentations on UTEP electronic databases searches.</td>
<td>Specific instructions (if available) will be posted in BB, Discussion Forum “Week 10”.</td>
</tr>
<tr>
<td>Nov. 9</td>
<td></td>
<td></td>
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<tr>
<td><strong>F2F</strong></td>
<td></td>
<td></td>
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<tr>
<td>Week 12</td>
<td>Nov 16</td>
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</tr>
<tr>
<td>ONLINE</td>
<td><strong>ONLINE</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Reading #2</strong> (see instructions about reading materials and reflection submission on Discussion Folder “Reading #2”).</td>
<td>Specific instructions will be posted in BB, Discussion Forum “Week 12”.</td>
<td></td>
</tr>
<tr>
<td>BB submission is required</td>
<td>Due: 11/22/2015, 11 pm MT</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Week 13</th>
<th>Nov 23</th>
</tr>
</thead>
<tbody>
<tr>
<td>ONLINE</td>
<td><strong>ONLINE</strong></td>
</tr>
<tr>
<td><strong>Reading #3</strong> (see instructions about reading materials and reflection submission on Discussion Folder “Reading #3”).</td>
<td>Specific instructions (if available) will be posted in BB, Discussion Forum “Week 13”.</td>
</tr>
<tr>
<td>BB submission is required</td>
<td>Due: 11/29/2015, 11 pm MT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Week 14</th>
<th>Nov 30</th>
</tr>
</thead>
<tbody>
<tr>
<td>F2F</td>
<td><strong>F2F</strong></td>
</tr>
<tr>
<td><strong>Final Group presentations.</strong></td>
<td>Specific instructions (if available) will be posted in BB, Discussion Forum “Week 14”.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Final Exam</th>
<th>Week 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dec 7</td>
<td><strong>F2F</strong></td>
</tr>
<tr>
<td><strong>Post-Test.</strong> <strong>Final Group presentations.</strong></td>
<td></td>
</tr>
</tbody>
</table>

### Appendices: Relevant Rubrics

#### Grading Rubric for Online Discussion

<table>
<thead>
<tr>
<th>Points</th>
<th>5</th>
<th>3-4</th>
<th>1-2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Analysis / Interpretation</strong></td>
<td>The message uses sources, including outside as well as required reading. In addition, it demonstrates that the student has gained new understanding of the topic.</td>
<td>Some messages do analysis or interpretation well, but a significant number do not. This might be because the analysis was not done well or because it was not attempted (that is, was simply opinion).</td>
<td>Messages generally show little evidence of analysis, consisting instead of opinion and feelings and impressions.</td>
</tr>
<tr>
<td><strong>Writing Skill</strong></td>
<td>Sentences are clear and wording is unambiguous. Correct word choice, correct spelling, and correct grammar. Writing style can still be conversational rather than formal. The writing does not have to be flawless, but it will be better than average writing.</td>
<td>Ordinary, good writing. Lapses are regular and patterned, but do not undermine the communication or the persuasiveness of the argument.</td>
<td>Grammar, spelling, and/or word choice errors are frequent enough that the sense of the message is lost or muddled.</td>
</tr>
<tr>
<td><strong>Participation</strong></td>
<td>Messages contribute to</td>
<td>Some messages contribute to ongoing</td>
<td>Messages are unconnected</td>
</tr>
</tbody>
</table>
ongoing conversations, as replies to questions or comments, or as new questions or comments. Messages that originate a thread usually generate responses. Student does not start a topic or pose a question and then abandon it. conversations, but others are disconnected. If the student starts a new thread, sometimes there is follow-up but sometimes there isn't. Student tries to further the class discussion but is not successful a significant number of times. Or, student posts a significant (though still a minority) number of messages that are off-the-cuff and do not contribute substantively.

No replies to other messages. Student never answers someone else's question. When student asks a question, there's no acknowledgment to any responses.

<table>
<thead>
<tr>
<th>Category</th>
<th>Exceeds Standards</th>
<th>Meets Standards</th>
<th>Does not Meet Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short Reflection</strong></td>
<td>The piece is thoughtful, engaging, and clearly written. The piece shows careful consideration of the topic at hand. It responds directly to the question or prompts and makes meaningful connections with the readings and course content. The piece has been proofread.</td>
<td>Shows adequate reflection along with some level of thoughtfulness, and may or may not have responded directly to the question or prompt. It also contain grammatical or sentence structure errors that disrupt the flow of the narrative.</td>
<td>Does not adequately address the question or prompt, and shows limited thoughtfulness.</td>
</tr>
<tr>
<td><strong>Points</strong></td>
<td>(10-8 pts)</td>
<td>(7-4 pts)</td>
<td>(3-1 pts)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Good (10-8 pts)</th>
<th>Fair (7-4 pts)</th>
<th>Poor (3-1 pts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge of Content and Summary</td>
<td>Solid knowledge and understanding of the topic to be presented is demonstrated. The presentation is clear and understandable.</td>
<td>Good knowledge and understanding of the topic to be presented is demonstrated. The presentation is clear and understandable, but some important points are not addressed.</td>
<td>Weak knowledge and understanding of the topic to be presented is demonstrated. The presentation is unclear.</td>
</tr>
<tr>
<td>Critical Thinking and Argumentation (this is applicable only if presenting the review of the article)</td>
<td>Strengths and weaknesses that are central to the key points of the article are addressed. The discussion of strengths and weaknesses take up the majority of the assignment.</td>
<td>Strengths and weaknesses that are peripheral to the article are addressed. The discussion of strengths and weaknesses take up the majority of the assignment.</td>
<td>Strengths and weaknesses are addressed peripherally or not at all. The discussion of strengths and weaknesses take up only a small part of the assignment.</td>
</tr>
<tr>
<td>Organization and</td>
<td>The presentation is well organized, has a very clear</td>
<td>The presentation is organized, has an intro, body and</td>
<td>The presentation is not well organized, has an unclear or</td>
</tr>
</tbody>
</table>
### Participation Rubric

Throughout the semester students are expected to:

- Be present (in mind and body) and be well prepared for class.
- Participate fully in class activities and assignments – take an active part in the work of small and large group; participate in discussions and attend class face-to-face sessions. Understand your roles and responsibilities in acquiring Student Learning Outcomes for this class.
- Make insightful comments, informed by required reading and your own critical thinking. Demonstrate reflections on your readings. Come to class with questions, comments and thoughts on readings.
- Treat class activities, group discussions as important components of the course, showing respect for fellow classmates and the course material.

Participation points will be assigned based on the extent to which students meet the above criteria.

<table>
<thead>
<tr>
<th>Description of performance</th>
<th>Points earned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student exceptionally and consistently demonstrates the criterion throughout the semester</td>
<td>4</td>
</tr>
<tr>
<td>Student proficiently and frequently demonstrates the criterion throughout the semester</td>
<td>3</td>
</tr>
<tr>
<td>Student satisfactory and intermittently demonstrates the criterion throughout the semester</td>
<td>2</td>
</tr>
<tr>
<td>Student inadequately and sporadically demonstrates the criterion throughout the semester</td>
<td>1</td>
</tr>
<tr>
<td>Student does not demonstrates the criterion throughout the semester</td>
<td>0</td>
</tr>
</tbody>
</table>

### Appendix 1:

TEST FRAMEWORK FOR FIELD 115: MATEMATHEMATICS 4–8

- Domain I: Number Concepts  
  Standard Assessed: I

- Domain II: Patterns and Algebra  
  Standard Assessed: II

- Domain III: Geometry and Measurement
Standard Assessed: III

- Domain IV: Probability and Statistics

Standard Assessed: IV
- Domain V: Mathematical Processes and Perspectives

Standards Assessed: V and VI
- Domain VI: Mathematical Learning, Instruction and Assessment

Standards Assessed: VII and VIII

THE STANDARDS:

DOMAIN I — NUMBER CONCEPTS (approximately 16% of the test)

MATHEMATICS STANDARD I:
Number Concepts: The mathematics teacher understands and uses numbers, number System 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.

DOMAIN II — PATTERNS AND ALGEBRA (approximately 21% of the test)

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.

DOMAIN III — GEOMETRY AND MEASUREMENT (approximately 21% of the test)

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.

DOMAIN IV — PROBABILITY AND STATISTICS (approximately 16% of the test)

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.

DOMAIN V — MATHEMATICAL PROCESSES AND PERSPECTIVES (approximately 10% of the test)

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.

MATHEMATICS 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.

DOMAIN VI — MATHEMATICAL LEARNING, INSTRUCTION AND ASSESSMENT (approximately 16% of the test)

MATHEMATICS 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.

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.

COMPETENCIES:

DOMAIN I — NUMBER CONCEPTS

Competency 001
THE TEACHER UNDERSTANDS THE STRUCTURE OF NUMBER SYSTEMS, THE DEVELOPMENT OF A SENSE OF QUANTITY AND THE RELATIONSHIP BETWEEN QUANTITY AND SYMBOLIC REPRESENTATIONS.

The beginning teacher:
A. Analyzes the structure of numeration systems and the roles of place value and zero in the base ten system.
B. Understands the relative magnitude of whole numbers, integers, rational numbers and real numbers.
C. Demonstrates an understanding of a variety of models for representing numbers (e.g., fraction strips, diagrams, pattern shaded regions, number lines).
D. Demonstrates an understanding of equivalency among different representations of rational numbers.
E. Selects appropriate representations of real numbers (e.g., fractions, decimals, percents, roots, exponents, scientific notation) for particular situations.
F. Understands the characteristics of the set of whole numbers, integers, rational numbers, real numbers and complex numbers (e.g., commutativity, order, closure, identity elements, inverse elements, density).
G. Demonstrates an understanding of how some situations that have no solution in one number system (e.g., whole numbers, integers, rational numbers) have solutions in another number system (e.g., real numbers, complex numbers).

Competency 002
THE TEACHER UNDERSTANDS NUMBER OPERATIONS AND COMPUTATIONAL ALGORITHMS.

The beginning teacher:
A. Works proficiently with real and complex numbers and their operations.
B. Analyzes and describes relationships between number properties, operations and algorithms for the four basic operations involving integers, rational numbers and real numbers.
C. Uses a variety of concrete and visual representations to demonstrate the connections between operations and algorithms.
D. Justifies procedures used in algorithms for the four basic operations with integers, rational numbers and real numbers and analyzes error patterns that may occur in their application.
E. Relates operations and algorithms involving numbers to algebraic procedures (e.g., adding fractions to adding rational expressions, division of integers to division of polynomials).
F. Extends and generalizes the operations on rationals and integers to include exponents, their properties and their applications to the real numbers.

Competency 003
THE TEACHER UNDERSTANDS IDEAS OF NUMBER THEORY AND USES NUMBERS TO MODEL AND SOLVE PROBLEMS WITHIN AND OUTSIDE OF MATHEMATICS.

The beginning teacher:
A. Demonstrates an understanding of ideas from number theory (e.g., prime factorization, greatest common divisor) as they apply to whole numbers, integers and rational numbers and uses these ideas in problem situations.
B. Uses integers, rational numbers and real numbers to describe and quantify phenomena such as money, length, area, volume and density.
C. Applies knowledge of place value and other number properties to develop techniques of mental mathematics and computational estimation.
D. Applies knowledge of counting techniques such as permutations and combinations to quantify situations and solve problems.
E. Applies properties of the real numbers to solve a variety of theoretical and applied problems.

DOMAIN II — PATTERNS AND ALGEBRA

Competency 004
THE TEACHER UNDERSTANDS AND USES MATHEMATICAL REASONING TO IDENTIFY, EXTEND AND ANALYZE PATTERNS AND UNDERSTANDS THE RELATIONSHIPS AMONG VARIABLES, EXPRESSIONS, EQUATIONS, INEQUALITIES, RELATIONS AND FUNCTIONS.

The beginning teacher:
A. Uses inductive reasoning to identify, extend and create patterns using concrete models, figures, numbers and algebraic expressions.
B. Formulates implicit and explicit rules to describe and construct sequences verbally, numerically, graphically and symbolically.
C. Makes, tests, validates and uses conjectures about patterns and relationships in data presented in tables, sequences or graphs.
D. Gives appropriate justification of the manipulation of algebraic expressions.
E. Illustrates the concept of a function using concrete models, tables, graphs and symbolic and verbal representations.
F. Uses transformations to illustrate properties of functions and relations and to solve problems.

Competency 005
THE TEACHER UNDERSTANDS AND USES LINEAR FUNCTIONS TO MODEL AND SOLVE PROBLEMS.

The beginning teacher:
A. Demonstrates an understanding of the concept of linear function using concrete models, tables, graphs and symbolic and verbal representations.
B. Demonstrates an understanding of the connections among linear functions, proportions and direct variation.
C. Determines the linear function that best models a set of data.
D. Analyzes the relationship between a linear equation and its graph.
E. Uses linear functions, inequalities and systems to model problems.
F. Uses a variety of representations and methods (e.g., numerical methods, tables, graphs, algebraic techniques) to solve systems of linear equations and inequalities.
G. Demonstrates an understanding of the characteristics of linear models and the advantages and disadvantages of using linear model in a given situation.

Competency 006
THE TEACHER UNDERSTANDS AND USES NONLINEAR FUNCTIONS AND RELATIONS TO MODEL AND SOLVE PROBLEMS.

The beginning teacher:
A. Uses a variety of methods to investigate the roots (real and complex), vertex and symmetry of a quadratic function or relation.
B. Demonstrates an understanding of the connections among geometric, graphic, numeric and symbolic representations of nonlinear functions.
C. Analyzes data and represents and solves problems involving exponential growth and decay.
D. Demonstrates an understanding of the connections among proportions, inverse variation and rational functions.
E. Understands the effects of transformations (on the graph of a nonlinear function).
F. Applies properties, graphs and applications of nonlinear functions to analyze, model and solve problems.
G. Uses a variety of representations and methods (e.g., numerical methods, tables, graphs, algebraic techniques) to solve systems of quadratic equations and inequalities.
H. Understands how to use properties, graphs and applications of nonlinear relations including polynomial, rational, radical, absolute value, exponential, logarithmic, trigonometric and piecewise functions and relations to analyze, model and solve problems.

Competency 007
THE TEACHER USES AND UNDERSTANDS THE CONCEPTUAL FOUNDATIONS OF CALCULUS RELATED TO TOPICS IN MIDDLE SCHOOL MATHEMATICS.
The beginning teacher:
A. Relates topics in middle school mathematics to the concept of limit in sequences and series.
B. Relates the concept of average rate of change to the slope of the secant line and instantaneous rate of change to the slope of the tangent line.
C. Relates topics in middle school mathematics to the area under a curve.
D. Demonstrates an understanding of the use of calculus concepts to answer questions about rates of change, areas, volumes and properties of functions and their graphs.

DOMAIN III — GEOMETRY AND MEASUREMENT
Competency 008
THE TEACHER UNDERSTANDS MEASUREMENT AS A PROCESS.
The beginning teacher:
A. Selects and uses appropriate units of measurement (e.g., temperature, money, mass, weight, area, capacity, density, percents, speed, acceleration) to quantify, compare and communicate information.
B. Develops, justifies and uses conversions within measurement systems.
C. Applies dimensional analysis to derive units and formulas in a variety of situations (e.g., rates of change of one variable with respect to another) and to find and evaluate solutions to problems.
D. Describes the precision of measurement and the effects of error on measurement.
E. Applies the Pythagorean theorem, proportional reasoning and right triangle trigonometry to solve measurement problems.

Competency 009
THE TEACHER UNDERSTANDS THE GEOMETRIC RELATIONSHIPS AND AXIOMATIC STRUCTURE OF EUCLIDEAN GEOMETRY.
The beginning teacher:
A. Understands concepts and properties of points, lines, planes, angles, lengths and distances.
B. Analyzes and applies the properties of parallel and perpendicular lines.
C. Uses the properties of congruent triangles to explore geometric relationships and prove theorems.
D. Describes and justifies geometric constructions made using a compass and straight edge and other appropriate technologies.
E. Applies knowledge of the axiomatic structure of Euclidean geometry to justify and prove theorems.

Competency 010
THE TEACHER ANALYZES THE PROPERTIES OF TWO- AND THREE-DIMENSIONAL FIGURES
The beginning teacher:
A. Uses and understands the development of formulas to find lengths, perimeters, areas and volumes of basic geometric figures.
B. Applies relationships among similar figures, scale and proportion and analyzes how changes in scale affect area and volume measurements.
C. Uses a variety of representations (e.g., numeric, verbal, graphic, symbolic) to analyze and solve problems involving two- and three-dimensional figures such as circles, triangles, polygons, cylinders, prisms and spheres.
D. Analyzes the relationship among three-dimensional figures and related two-dimensional representations (e.g., projections, cross-sections, nets) and uses these representations to solve problems.

Competency 011
THE TEACHER UNDERSTANDS TRANSFORMATIONAL GEOMETRY AND RELATES ALGEBRA TO GEOMETRY AND TRIGONOMETRY USING THE CARTESIAN COORDINATE SYSTEM.

The beginning teacher:
A. Describes and justifies geometric constructions made using a reflection device and other appropriate technologies.
B. Uses translations, reflections, glide-reflections and rotations to demonstrate congruence and to explore the symmetries of figures.
C. Uses dilations (expansions and contractions) to illustrate similar figures and proportionality.
D. Uses symmetry to describe tessellations and shows how they can be used to illustrate geometric concepts, properties and relationships.
E. Applies concepts and properties of slope, midpoint, parallelism and distance in the coordinate plane to explore properties of geometric figures and solve problems.
F. Applies transformations in the coordinate plane.
G. Uses the unit circle in the coordinate plane to explore properties of trigonometric functions.

DOMAIN IV — PROBABILITY AND STATISTICS

Competency 012
THE TEACHER UNDERSTANDS HOW TO USE GRAPHICAL AND NUMERICAL TECHNIQUES TO EXPLORE DATA, CHARACTERIZE PATTERNS AND DESCRIBE DEPARTURES FROM PATTERNS.

The beginning teacher:
A. Organizes and displays data in a variety of formats (e.g., tables, frequency distributions, stem-and-leaf plots, box-and-whisker plots, histograms, pie charts).
B. Applies concepts of center, spread, shape and skewness to describe a data distribution.
C. Supports arguments, makes predictions and draws conclusions using summary statistics and graphs to analyze and interpret one-variable data.
D. Demonstrates an understanding of measures of central tendency (e.g., mean, median, mode) and dispersion (e.g., range, interquartile range, variance, standard deviation).
E. Analyzes connections among concepts of center and spread, data clusters and gaps, data outliers and measures of central tendency and dispersion.
F. Calculates and interprets percentiles and quartiles.

Competency 013
THE TEACHER UNDERSTANDS THE THEORY OF PROBABILITY.

The beginning teacher:
A. Explores concepts of probability through data collection, experiments and simulations.
B. Uses the concepts and principles of probability to describe the outcome of simple and compound events.
C. Generates, simulates and uses probability models to represent a situation.
D. Determines probabilities by constructing sample spaces to model situations.
E. Solves a variety of probability problems using combinations, permutations and geometric probability (i.e., probability as the ratio of two areas).
F. Uses the binomial, geometric and normal distributions to solve problems.

Competency 014
THE TEACHER UNDERSTANDS THE RELATIONSHIP AMONG PROBABILITY THEORY, SAMPLING AND STATISTICAL INFERENCE AND HOW STATISTICAL INFERENCE IS
USED IN MAKING AND EVALUATING PREDICTIONS.
The beginning teacher:
A. Applies knowledge of designing, conducting, analyzing and interpreting statistical experiments to investigate real-world problems.
B. Demonstrates an understanding of random samples, sample statistics and the relationship between sample size and confidence intervals.
C. Applies knowledge of the use of probability to make observations and draw conclusions from single variable data and to describe the level of confidence in the conclusion.
D. Makes inferences about a population using binomial, normal and geometric distributions.
E. Demonstrates an understanding of the use of techniques such as scatter plots, regression lines, correlation coefficients and residual analysis to explore bivariate data and to make and evaluate predictions.

DOMAIN V — MATHEMATICAL PROCESSES AND PERSPECTIVES
Competency 015
THE TEACHER UNDERSTANDS MATHEMATICAL REASONING AND PROBLEM SOLVING.
The beginning teacher:
A. Demonstrates an understanding of proof, including indirect proof, in mathematics.
B. Applies correct mathematical reasoning to derive valid conclusions from a set of premises.
C. Demonstrates an understanding of the use of inductive reasoning to make conjectures and deductive methods to evaluate the validity of conjectures.
D. Applies knowledge of the use of formal and informal reasoning to explore, investigate and justify mathematical ideas.
E. Recognizes that a mathematical problem can be solved in a variety of ways and selects an appropriate strategy for a given problem.
F. Evaluates the reasonableness of a solution to a given problem.
G. Applies content knowledge to develop a mathematical model of a real-world situation and analyzes and evaluates how well the model represents the situation.
H. Demonstrates an understanding of estimation and evaluates its appropriate uses.

Competency 016
THE TEACHER UNDERSTANDS MATHEMATICAL CONNECTIONS WITHIN AND OUTSIDE OF MATHEMATICS AND HOW TO COMMUNICATE MATHEMATICAL IDEAS AND CONCEPTS.
The beginning teacher:
A. Recognizes and uses multiple representations of a mathematical concept (e.g., a point and its coordinates, the area of circle as a quadratic function in r, probability as the ratio of two areas).
B. Uses mathematics to model and solve problems in other disciplines, such as art, music, science, social science and business.
C. Expresses mathematical statements using developmentally appropriate language, standard English, mathematical language and symbolic mathematics.
D. Communicates mathematical ideas using a variety of representations (e.g., numeric, verbal, graphic, pictorial, symbolic, concrete).
E. Demonstrates an understanding of the use of visual media such as graphs, tables, diagrams and animations to communicate mathematical information.
F. Uses the language of mathematics as a precise means of expressing mathematical ideas.
G. Understands the structural properties common to the mathematical disciplines.

DOMAIN VI — MATHEMATICAL LEARNING, INSTRUCTION AND ASSESSMENT
Competency 017
THE TEACHER UNDERSTANDS HOW CHILDREN LEARN AND DEVELOP MATHEMATICAL SKILLS, PROCEDURES AND CONCEPTS.
The beginning teacher:
A. Applies theories and principles of learning mathematics to plan appropriate instructional activities for all students.
B. Understands how students differ in their approaches to learning mathematics with regard to diversity.
C. Uses students’ prior mathematical knowledge to build conceptual links to new knowledge and plans instruction that builds on students’ strengths and addresses students’ needs.
D. Understands how learning may be assisted through the use of mathematics manipulatives and technological tools.
E. Understands how to motivate students and actively engage them in the learning process by using a variety of interesting, challenging and worthwhile mathematical tasks in individual, small-group and large-group settings.
F. Understands how to provide instruction along a continuum from concrete to abstract.
G. Recognizes the implications of current trends and research in mathematics and mathematics education.

Competency 018
THE TEACHER UNDERSTANDS HOW TO PLAN, ORGANIZE AND IMPLEMENT INSTRUCTION USING KNOWLEDGE OF STUDENTS, SUBJECT MATTER AND STATEWIDE CURRICULUM (TEXAS ESSENTIAL KNOWLEDGE AND SKILLS [TEKS]) TO TEACH ALL STUDENTS TO USE MATHEMATICS.

The beginning teacher:
A. Demonstrates an understanding of a variety of instructional methods, tools and tasks that promote students’ ability to do mathematics described in the TEKS.
B. Understands planning strategies for developing mathematical instruction as a discipline of interconnected concepts and procedures.
C. Develops clear learning goals to plan, deliver, assess and reevaluate instruction based on the TEKS.
D. Understands procedures for developing instruction that establishes transitions between concrete, symbolic and abstract representations of mathematical knowledge.
E. Applies knowledge of a variety of instructional delivery methods, such as individual, structured small-group and large-group formats.
F. Understands how to create a learning environment that provides all students, including English-language learners, with opportunities to develop and improve mathematical skills and procedures.
G. Demonstrates an understanding of a variety of questioning strategies to encourage mathematical discourse and to help students analyze and evaluate their mathematical thinking.
H. Understands how technological tools and manipulatives can be used appropriately to assist students in developing, comprehending and applying mathematical concepts.
I. Understands how to relate mathematics to students’ lives and a variety of careers and professions.

Competency 019
THE TEACHER UNDERSTANDS ASSESSMENT AND USES A VARIETY OF FORMAL AND INFORMAL ASSESSMENT TECHNIQUES TO MONITOR AND GUIDE MATHEMATICS INSTRUCTION AND TO EVALUATE STUDENT PROGRESS.

The beginning teacher:
A. Demonstrates an understanding of the purpose, characteristics and uses of various assessments in mathematics, including formative and summative assessments.
B. Understands how to select and develop assessments that are consistent with what is taught and how it is taught.
C. Demonstrates an understanding of how to develop a variety of assessments and scoring procedures consisting of worthwhile tasks that assess mathematical understanding, common misconceptions and error patterns.
D. Understands how to evaluate a variety of assessment methods and materials for reliability, validity, absence of bias, clarity of language and appropriateness of mathematical level.
E. Understands the relationship between assessment and instruction and knows how to evaluate assessment results to design, monitor and modify instruction to improve mathematical learning for all students, including English-language learners.