Course Title: Teaching Mathematics in Elementary Schools

Course Prefix/Number: MAE 4310
Course Credit Hours: 3
Lead Instructor: Dr. Giang-Nguyen Nguyen
Classroom: Online
Days/Times of class: Online

Office: Building 85 Room 195
Phone: 850-857-6461
E-mail: gnguyeng@uwf.edu
Office Hours: M:9:00-11:00
TR: 10:00 – 11:00 & 12:30-2:30 pm
Friday/Online Meeting: by appointments

Prerequisites or Co-Requisites: None

Course Description

Theory and methods for teaching mathematics in the elementary school; contemporary approaches to teaching concepts, number systems, numeration systems, computational algorithms, problem solving, informal geometry, measurement and other topics. Material and supply fee will be assessed.

This course is a requirement for the elementary education teacher preparation program. It is designed to provide students with the methodology requisite to effective mathematics teaching in elementary school classroom school classroom. The coursework centers on utilizing mathematics content knowledge and process skills in the development of effective instructional strategies for the elementary level learner. The primary focus of the courses will be to develop pedagogical content knowledge as it relates to elementary mathematics teaching. This course addresses the Next Generation Sunshine State Standards (NGSSS) within lesson planning assignments. Additionally, students will be introduced to various forms of assessment such as the Florida Comprehensive Assessment Test (FCAT), which measured student progress toward meeting the Sunshine State Standard benchmarks.

Program Goals

The Empowered Professional Making a Difference is the theme of the Professional Education Unit’s conceptual framework. This theme focuses learning experiences on activities that permit the candidate to examine what he/she does and to make a difference in the instructional process. The subject matter, class activities, and skill development of this course were selected to assist your professional growth in one or more of the following Empowered Professional Making a Difference characteristics: a) critical thinker, b) lifelong learner, c) counselor/mentor, d) decision maker, e) problem solver, and f) ethical/moral professional.

The State of Florida has responded to national and state initiatives in education reform and accountability by creating legislative policies relative to the preparation of educators. Florida’s
Uniform Core Curricula outline the knowledge, skills and dispositions that candidates require to be successful in Florida’s educational system.

**Key Assignments and Critical Tasks**

To monitor your progress in this teacher preparation program, Key Assignments are required. Key Assignments are specific learning activities that directly relate to the course and program learning outcomes. A passing grade (70% or higher) is required on each of the student learning outcomes identified on the assignment in order to receive a grade for the course and advance in the teacher education program. (Specific details are provided in your Teacher Education Handbook.) The Thematic Science Unit is a Key Assignment/Critical Task for this course.

**Course Goals/Student Learning Outcomes (SLOs)**

1. Students will demonstrate an understanding of the nature of mathematics, mathematics teaching.
2. Students will investigate and participate in mathematics education reform based activities.
3. Students will demonstrate effective mathematics teaching practices for the elementary classroom.
4. Students will produce developmentally appropriate activity-based lessons, selecting and using appropriate tools/materials for teaching mathematics.
5. Students will use a variety of strategies in assessing student learning of mathematics concepts.

**Topics**

**Topic: Teaching Mathematics: Influences and Directions**

1. Recognize the factors that influence the teaching of mathematics.
2. Describe why national and global assessments such as NAEP and TIMSS are important to mathematics curriculum development.
3. Describe how national, state, and local mathematics curriculum standards might influence classroom teaching.

**Topic: Learning and Teaching Mathematics**

1. Differentiate between the behaviorist approach and the constructivist approach to teaching.
2. Identify the five different modes in which a mathematics concept may be represented.
3. Discuss whether or not communication is important in the mathematics classroom.
4. Differentiate between conceptual knowledge and procedural knowledge, giving an example of each of these types of knowledge.

**Topic: Developing Mathematical Thinking and Problem-Solving Ability**
1. Define a mathematical problem.
2. Differentiate the various types of problems.
3. Provide examples of several different types of problems.
4. Discuss the four steps involved in the problem-solving process.
5. Describe how the components of a problem-solving instructional program can help teachers plan instruction.

**Topic: Assessing Mathematics Understanding**

1. Discuss the purposes of assessment.
2. Define the different types of assessment and describe the benefits of each.
4. How to use FCAT results to modify individual instruction.
5. Develop small group instruction based on FCAT results and continuous assessment.
6. Identify error patterns in student work.

**Topic: Developing Number Concepts & Understanding of Numeration**

1. Describe the types of pre-number activities that children must engage in to develop an understanding of number concepts.
2. Recognize the types of counting abilities that are necessary for children to develop.
3. Identify several ways in which children must be able to represent numbers.
4. Discuss the types of number relationships that are essential for children to understand.
5. Explain why our number system is called a "place-value" system.
6. Provide an example of a proportional base-ten model, a nonproportional base-ten model, and differentiate between the two models.
7. Define "equivalent representations."

**Topic: Developing Whole Number Operations/Mastering the Basic Facts**

1. Write a word problem for each type of addition, subtraction, multiplication, and division problem.
2. Illustrate how each type of word problem could be modeled with objects.
3. Explain the difference between partitive and measurement division. How might a child use counters to show 6/2 for each interpretation of division.
4. Define the three components of instruction on basic facts.
5. Describe several thinking strategies that children can employ for each of the whole number operations.
6. Define the role of consolidating activities for drill and practice, and describe several of these activities.
7. Describe how games are useful in promoting the immediate recall of basic facts.

**Topic: Estimation and Computational Procedures for Whole Numbers**

1. Differentiate between mental computation and computational estimation, giving an example of each.
2. Explain how algorithms differ for different operations, giving examples of two algorithms for each operation.
3. Explain why it is important to link mental computation and computational estimation with paper-and-pencil computation and the use of calculators.

**Topic: Developing Fraction Concepts/Fractional Computation**

1. Explain what children should understand about fractions.
2. Define three models that can be used in teaching the part-whole interpretation of fractions, providing an example of each. Additionally, describe the teaching considerations involved.
3. Describe strategies that teachers can use to help children understand how to compare fractions.
4. Explain why it is important to help children understand the equivalence of fractions.
5. List the prerequisites for operations on fractions.
6. Explain what it means to help children develop operation sense.
7. Explain what each operation on fractions mean and discuss a real-world situation that exemplifies each operation on fractions.
8. Describe models that will help children understand operations on fractions.

**Topic: Developing Decimal Concepts/Understanding Ratio, Proportion, and Percent**

1. Describe how teachers can use models to help children understand decimals and operations on decimals.
2. Explain how decimals are related to whole numbers and fractions.
3. Explain what each operation on decimals mean and discuss a real-world situation that exemplifies each operation on decimals.
4. Differentiate ratios, rates, unit rates, proportions, and percents from one another.
5. Describe some real-world settings in which ratio, rate, unit rate, proportion, and percent are used.
6. Describe models that can be used to help children understand percents.

**Topic: Developing Geometric Thinking**

1. Describe how a teacher might use the van Hiele levels of geometric thought in planning instruction.
2. Explain how a teacher might help children develop spatial sense.
3. Describe concepts that should be taught to encourage children to develop geometric thinking and spatial sense.
4. Explain how a teacher encourages students to investigate, describe, and recognize geometric shapes and properties of geometric shapes.

**Topic: Developing Measurement Concepts**

1. Differentiate between standard and nonstandard units of measurement.
2. Provide examples of situations in which measurement is needed, describing at least one example for each attribute: length, area, volume, capacity, mass, time, temperature, and angle.

Texts / Materials

REQUIRED MATERIALS:

- TK20 Subscription available directly at http://uwf.tk20.com or through the UWF campus bookstore
- Student Access Kits (ISBN 0-9774408-1-8)
- Word processor. Consider using Evernote (downloadable for free at evernote.com) for your Journal
- eLearning access

REQUIRED TEXT


REFERENCES/BIBLIOGRAPHY:


ABOUT THIS COURSE:

This course is delivered completely online. You must have consistent access to the Internet. Learning at a distance may be a very different environment for many of you. You will generally set your own schedules, participate in class activities at your convenience, and work at your own pace. You may spend some additional time online during the first few weeks while you become acclimated to the online class format and you may feel overwhelmed. You should also be prepared to spend approximately 8 - 10 hours per week online completing lessons, activities, and participating in class discussions. Finally, you may want to incorporate these tips to help you get started:

Set yourself a schedule -- check the course web site early in the class week to see what tasks
you'll need to work on for the week. Become very familiar with the site and how to use it. It is a tool to help you learn! Team up with your classmates to discuss class assignments and questions you might have. Check the “Classist” link for biography info and email addresses. Ask questions when you need answers. If you have problems, contact your instructor ASAP!

**Grading / Evaluation**

**EXPECTATIONS AND GRAADING POLICY:**

Prepare to spend approximately 9 hours per week for this online course 1) regularly logging in and actively participating in discussions and asynchronous sessions, 2) watching, processing, and analyzing videos, 3) reading and analyzing books and articles, and 4) preparing and timely submitting assignments and activities.

Course evaluation and grading will be based upon a student's performance as evidenced by the course requirements. The grading structure of MAE4310 is arranged according to a point structure. You earn a letter grade for each component or requirement of the class that you meet, and your overall grade is weighted so that the final grade represents a stated portion of different types of work. This is elucidated in further detail on the assignments table below.

<table>
<thead>
<tr>
<th>Assignments</th>
<th>Value</th>
<th>Descriptions</th>
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<tbody>
<tr>
<td>Participation</td>
<td>25%</td>
<td>You will be asked to interact with your peers discussing what you have learned through the online discussion forum. Students will be expected to discuss the mathematics teaching and manipulative videos. Initial discussion questions are provided. Your responses should be thoughtful and in sufficient detail to fully answer the question (See Discussion Rubrics). Additionally, you are required to complete quizzes for the course.</td>
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<tr>
<td>Midterm</td>
<td>25%</td>
<td>Midterm will be multiple-choice based on class discussion, readings, assignments, and completed on the date indicated on the outline.</td>
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<tr>
<td>Writing Assignment</td>
<td>25%</td>
<td>Your writing assignments will include various topics. Most of the writing assignments will focus on identifying instructional strategies, thinking strategies, physical model, technology, and/or manipulative models that could be used to teach mathematics in elementary schools. You should utilize the contents discussed in the course, textbook, and peer-reviewed articles to demonstrate your knowledge of the most effective way to teach each of the five mathematics content areas (Numbers and Operations, Geometry, Measurement, Algebra, and Data Analysis and Probability). Papers must be typed with 12 point Times New Roman fonts, and 1-inch margins. Limit your paper to one page with 1.5 spacing. Each paper will be given a point value of 10. The total points earned on all specified papers will represent one-quarter (25%) of the final grade.</td>
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separate rubric will be provided. (See rubric for Writing Assignment).

Comprehensive Final Paper 25%

This is the critical task for this course. This assignment will be submitted in TK20. You will use knowledge and skills acquired from class discussions, problem-based activities, manipulative papers, peer-review journal articles, and the textbook to demonstrate a clear understanding of mathematics subject area competencies and skills. You will show your knowledge of instruction and assessment by identifying a variety of appropriate instructional strategies for teaching specific concepts and ways that manipulatives, mathematical and physical models, and technology can be used in instruction for the following concepts: (1) Numbers and Operations, (2) Geometry and Measurement, (3) Algebra, and (4) Data Analysis

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<tr>
<th>Grade</th>
<th>Description</th>
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<tr>
<td>A</td>
<td>93% or better</td>
<td>77% to 79%</td>
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<tr>
<td>A -</td>
<td>90% to 92%</td>
<td>73% to 76%</td>
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<tr>
<td>B +</td>
<td>87% to 89%</td>
<td>70% to 72%</td>
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<tr>
<td>B</td>
<td>83% to 86%</td>
<td>60% to 69%</td>
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<tr>
<td>B -</td>
<td>80% to 82%</td>
<td>50% or less</td>
</tr>
<tr>
<td>C +</td>
<td>90% to 92%</td>
<td>73% to 76%</td>
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<tr>
<td>C</td>
<td>87% to 89%</td>
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<td>50% or less</td>
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<td>F</td>
<td>50% or less</td>
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**Attendance Policy**

**Email & Proper E-mail Netiquette** Use UWF e-mail for all correspondence. Students are expected to check e-mail on a frequent and regular basis (a minimum of two to three times weekly) in order to stay current with University-related communications, recognizing that certain communications may be time-critical. It is recommended that e-mail be checked daily. Students are expected to check the eLearning daily for announcements. Please identify yourself by first and last name and indicate the nature of your email (i.e., concerns, questions, comments, assignments or grades).

Class participation is a factor in this course, and you are expected to actively participate in discussion boards. Treat your classmates and your instructor respectfully. Contact your classmates if you have any general questions you should post it in the Discussion Forum (Center of Questions and Answer) – CQA. Everyone in our class should have access to this. Additionally, you can send out an email using “Classist”

Class rules are 1) You can do anything you want as long as you do not cause a problem for anyone (including your instructor and you) in the class. If there is a problem, the instructor will do something. What the instructor does will depend on you, the problem, and what you are willing to do to solve the problem. 2) If you have a concern or issue with regards to this course, first make the instructor aware by politely communicating the nature of the problem. For instance, you could send an email indicating "I would like to speak with you about my grade on the first quiz."

Attendance: To do well in MAE4310, you must complete your assignments fully and submit as
requested. Unless otherwise noted, all assignments must be completed individually. Weekly assignments are described and outlined in the content pages for each session. To comply with course requirements and be credited for assignments, you will need to read through all components of each session. Drop boxes will be opened each week for 5 days for the assignment that is due that week. At the end of the week the drop box will be closed.

**Late Work Policy**

Full credit will be given when assignments are turned in on time. I understand there are circumstances that delay your work progress. Therefore, I will consider late work. If you must submit a late assignment, it should be placed in the Excuse Folder in DropBox and provide proper documentation along with your assignment. After submitting the following: (1) Send me an email indicating that you already submit the assignment. (2) Since you are submitting the assignment late, please allow the instructor at least one week to grade. Please being considerate to this policy if feedback was delayed.

**Excused Documentations** (must attached proofs such as hospitalization, obituaries, military services, etc. This must be based on institution policy (http://uwf.edu/catalog/cat2007/acadattendance.htm)
- Your assignment should be submitted within three days of coming back. After the three days, it will be considered as unexcused late work.

**Un-excused:** Did not inform the instructor about missing assignment at least 24 hours before the due date
- Your grade will be deducted 10% a day including the weekend.

Note: You will not be able to make up online discussion. However the lowest discussion grade/participation will be dropped at the end of the semester.

**Withdraw or Drop the Course**

The last day to drop a course from this semester is 01/31/12. The last day to withdraw from a course this semester with a partial refund and a grade of “WR” is 02/03/13. The last day to withdraw from a course this semester with no refund of tuition or fees and a grade of “W” is 03/16/13.

**Expectations for Academic Conduct / Plagiarism Policy**

Academic Conduct Policy: (Web Site) | (PDF Format) | Plagiarism Policy: (WORD Format) | UWF Library Online Tutorial: Plagiarism |

**Assistance for Students with Disabilities**

The Student Disability Resource Center (SDRC) at the University of West Florida supports an inclusive learning environment for all students. If there are aspects of the instruction or design of this course that hinder your full participation, such as time-limited exams, inaccessible web content, or the use of non-captioned videos and podcasts, please notify the instructor or the
SDRC as soon as possible. You may contact the SDRC office by e-mail at sdrc@uwf.edu or by phone at (850) 474-2387. Appropriate academic accommodations will be determined based on the documented needs of the individual.

**Minimum Technical Skills and Special Technology Utilized by Students**

This course is totally online. All instructional content and interaction take place over the WWW. In addition to baseline word processing skills and sending/receiving email with attachments, students will be expected to search the internet and upload / download files. In addition, students may need one or more of the following plug-ins:

- Real Player: [http://www.real.com/realplayer/search](http://www.real.com/realplayer/search)
- eLearning's Accessibility Resource Guides for users: [http://www.desire2learn.com/access/resources/](http://www.desire2learn.com/access/resources/)

**Accessibility Resources**

The Student Disability Resource Center (SDRC) at the University of West Florida supports an inclusive learning environment for all students. If there are aspects of the instruction or design of this course that hinder your full participation, such as time-limited exams, inaccessible web content, or the use of non-captioned videos and podcasts, please notify the instructor or the SDRC as soon as possible. You may contact the SDRC office by e-mail at sdrc@uwf.edu or by phone at (850) 474-2387. Appropriate academic accommodations will be determined based on the documented needs of the individual.

**Accessibility Resources**

- Follow this link for information on accessibility settings in eLearning.
- Follow this link for information on accessibility features in UWF's Learning Management System (LMS), Desire2Learn.

**TurnItIn**

UWF maintains a university license agreement for an online text matching service called TurnItIn. At my discretion, I will use the TurnItIn service to determine the originality of student papers. If I submit your paper to TurnItIn, it will be stored in a TurnItIn database for as long as the service remains in existence. If you object to this storage of your paper:
1. You must let me know no later than two weeks after the start of this class.
2. I will utilize other services and techniques to evaluate your work for evidence of appropriate authorship practices.

Weather Emergency Information

In the case of severe weather or other emergency, the campus might be closed and classes cancelled. Official closures and delays are announced on the UWF website and broadcast on WUWF-FM.

- WUWF-FM (88.1MHz) is the official information source for the university. Any pertinent information regarding closings, cancellations, and the re-opening of campus will be broadcast.
- In the event that hurricane preparation procedures are initiated, the UWF Home Web Page and Argus will both provide current information regarding hurricane preparation procedures, the status of classes and the closing of the university.

Emergency plans for the University of West Florida related to weather or other emergencies are available on the following UWF web pages:

- Information about hurricane preparedness plans is available on the UWF web site: http://uwfemergency.org/hurricaneprep.cfm
- Information about other emergency procedures is available on the UWF web site: http://uwfemergency.org/

Syllabus Revision

Revisions may be required - please check eLearning regularly for updates and changes!

Flexible Syllabus: This syllabus is a tentative agreement between the professor and the student enrolled in the course and in no way represents a binding contract. The professor reserves the right to make changes to this document if needed. Students are responsible for recording any changes on their syllabi.

A tentative semester overview is provided with this handout. Every attempt will be made to adhere to the schedule provided, but the instructor reserves the right to make changes as needed. Announcements about these changes will be made in class and posted to the course web site.