

**EDUC 667 SPED: K-12 Math**

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| **Semester/Year**  2020 Fall Semester  10/05/2020-12/12/2020 | **Instructor:**  Laura A Farris, Ed.D.  Adjunct Professor |
| **Course# and Credits:**  ED 667 3 credits | **Email:**  Laura.farris@chaminade.edu |
| **Class Title:**  **SPED: K-12 Math Methods** | **Telephone:**  808-358-6151© |
| **Course Format:**  On-ground/Hybrid/**Online** | **Office Hours/When to Contact:**  Contact by phone/email |
| **Class Location:**  Online | **Office Location:**  Online |
| **Class Time/Day:**  Online | **Other:** |
| **O&P/Service Requirement:**  10 hours | **Texts:**  [**Elementary and Middle School Mathematics: Teaching Developmentally, Pearson Loose-Leaf Version**](http://www.pearsonhighered.com/educator/product/Elementary-and-Middle-School-Mathematics-Teaching-Developmentally-Enhanced-Pearson-eText-LooseLeaf-Version-Access-Card-P/9780134046952.page), **Van de Walle, Karp & Bay-Williams** ©2016 | Pearson | Unbound |  statusCode = 5 prePackInd = 2 uopsTitleStat =  format = Unbound (saleable) with Access Card  ISBN-10: 0134046951 | ISBN-13: 9780134046952  **Either 9th or 10th edition will work fine. May be cheaper to get 9th edition online.** |

**Catalog Description:**

ED 667 SPED: K-12 Math

This course provides an overview and application of best practice mathematics instructional approaches, strategies, techniques and assessment methods for students with mild/moderate disabilities in K-12 settings. This class *requires* ***10 HOURS*** *observation and participation in a classroom.*

**Conceptual Framework:**

The Education Division’s Conceptual Framework is based upon a set of beliefs that flow from the University’s vision and mission statements, the Division’s vision and mission statements, and the core academic beliefs of Chaminade University. These values and beliefs are based on the Catholic Marianist principles; a commitment to mentor teacher and educational leader candidates to their fullest potential; a commitment to teaching, scholarship and research; and a commitment to serve the university and the larger community. This alignment is designed to prepare education professionals who meet the National Council for Accreditation of Teacher Education (NCATE) standards for effective teaching by demonstrating professional dispositions and empathy, content knowledge, and the pedagogical/leadership skills to work effectively work with a diverse community of learners.

**Marianist Values and Special Education**

Teacher candidates in Chaminade’s educational programs are educated to appreciate and value diversity, to see all students as unique human beings. They learn that within a classroom community, there will be similarities and differences in learners, with and without exceptional learning needs. The experiences of individuals with exceptional learning needs can impact families, as well as the individual’s ability to learn, interact socially, and live as fulfilled contributing members of the community. Known for their strong sense of community, Marianists have traditionally spoken of this sense as “family spirit.” Marianist educational experience fosters the development of a community characterized by a sense of family spirit that accepts each person with loving respect. Teacher candidates use their knowledge of instructional practices to create an inclusive community of learners. Successful students will then be able to enjoy and contribute to the life of the wider community.

Selected from *Characteristics of Marianist Universities: A Resource Paper* Published in 1999 by

Chaminade University of Honolulu, St. Mary’s University and University of Dayton.

**Program Learning Outcomes (PLOs):**

Successful teacher candidates in Chaminade initial teacher licensure programs will demonstrate knowledge, skills, and dispositions in the following areas:

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| --- | --- |
| **PLO1** | **Content Knowledge** (*Knowledge of subject matter*) |
| **PLO2** | **Developmentally Appropriate Practice (***Knowledge of how students develop and learn, and engagement of students in developmentally appropriate experiences that support learning*) |
| **PLO3** | **Pedagogical Content Knowledge** (*Knowledge of how to teach subject matter to students and application of a variety of instructional strategies that are rigorous, differentiated, focused on the active involvement of the learner*) |
| **PLO4** | **Educational Technology** (*Knowledge of and application of appropriate technology for student learning*) |
| **PLO5** | **Assessment for Learning** (*Knowledge of and use of appropriate assessment strategies that enhance the knowledge of learners and their responsibility for their own learning*) |
| **PLO6** | **Diversity** (*Skills for adapting learning activities for individual differences and the needs of diverse learners and for maintaining safe positive, caring, and inclusive learning environments)* |
| **PLO7** | **Focus on Student Learning** (*Skills in the planning and design of meaningful learning activities that support and have positive impact on student learning based upon knowledge of subject matter, students, the community, curriculum standards, and integration of appropriate technology*) |
| **PLO8** | **Professional & Ethical Dispositions and Communication** (Professional dispositions, professionalism in teaching, and ethical standards of conduct consistent with Marianist values, and positive and constructive relationships with parents, the school community and professional colleagues) |

**ED 667 Course Learning Objectives:**

At the end of this course, the students will:

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| --- | --- |
| **CLO 1** | Demonstrate competency in mathematical content knowledge and evidence-based strategies in teaching exceptional learners. |
| **CLO 2** | Analyze student work to diagnose errors, misperceptions and plan activities acquire mathematical concepts and/of skills that address these misperceptions. |
| **CLO 3** | Research and write a report on instructional and assistive technologies that would benefit students in gaining mathematical concepts and skills. |
| **CLO 4** | Create problem solving lesson plans using children’s literature to help exceptional students understand and learn mathematical concepts. |
| **CLO 5** | Adapt traditional lesson plans and make them appropriate for diverse learners. |

**Linkages between Course Learning Objectives (CLOs) and Program Learning Objectives**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | PLO 1 | PLO 2 | PLO 3 | PLO 4 | PLO 5 | PLO 6 | PLO 7 | PLO 8 |
| CLO 1 | x | x | x |  |  |  |  |  |
| CLO 2 |  |  |  |  | x |  |  |  |
| CLO 3 | x |  |  | x |  |  | x |  |
| CLO 4 |  |  | x |  |  | X |  |  |
| CLO 5 |  |  | x |  |  | X |  |  |

**Essential Questions Addressed in This Course**

|  |  |  |
| --- | --- | --- |
|  | **Related CLOs** | **Related PLOs** |
| How do exceptional learners with differing abilities and learning styles acquire mathematical concepts and skills? | 2, 4, 5 | 1, 6, 3 |
| How can teachers identify mathematical misconceptions that students may and correct those misperceptions? | 2, 3 | 2, 5 |
| What are the instructional and assistive technologies (games, computer programs, etc.) that help exceptional students acquire mathematical concepts and /or skills? | 1, 3, 4, 5 | 6, 4 |

**Key Teaching-Learning Strategies**

This is an online course. The learning strategies include:

Online assignments

Participation with online peers

Observation & Participation (O & P) sessions

Lesson Plans, Mini Unit

Individual research

**Course Requirements**

| **Assignment** | **Pts** | **Assignment Description** | **Due Date** |
| --- | --- | --- | --- |
| Signature  Assignment:  Math Unit | 40 | This will be a case study on a focus learner from your O & P sessions. Create a math unit on one strand covered in the common core math standards on which your student is working on. It will contain three (3) to five (5) sequential lesson plans that cover the stages discussed in the text (exploratory or developmental, practice and application) that build upon one another. You will need to have pre and post assessment data and samples of student artifacts. In addition, your lesson should incorporate principles of the Chaminade Lesson Plan template (in DocShare) to address diverse learners and have multiple ways to present material, engage the student and assess. Teaching methods should be evidence-based. To be submitted to LiveText. | End of week 9 |
| Diagnosis and Remedial Plans  (one per week starting in week 2) | 40  (5 each) | (These can be found in DocShare). You will be presented students’ work from the different strands of mathematics. You will analyze these samples, diagnose errors and misconceptions, and determine instructional strategies to remediate the misunderstandings. You will then list strategies and give examples showing how you would ‘reteach’ and construct accurate meaning for the student. (1 page double spaced). To be submitted to the instructor’s Dropbox. | Ongoing through week 9 |
| Instruction and Assistive Technology Report | 10 | Research instructional and assistive technologies (games, computer programs, web-based sites, school subscriptions, etc.) that help exceptional students acquire mathematical concepts and /or skills. A list of 4-6 items with a short descriptive paragraph of the uses and benefits of each item will suffice. Provide an example of how you might use them in your classroom. To be submitted to the instructor’s Dropbox. | End of week 2 |
| Problem Based Lesson Plan Using Children’s Literature | 10 | Using the *Literature Connections* as a resource (at the end of chapters 8-23 of the required textbook) or another children’s book which you know of related to math, you will choose a book and write a paragraph synopsis of the story. Then you will create a lesson plan having to do with problem solving using the *Three Phase Lesson Format* found in Chapter 4 of the required textbook. The book should be used as the *Before Phase* of the lesson. To be submitted to the instructor’s Dropbox. | End of week 4 |
| Adapted Lesson Plan | 10 | Using a traditional math lesson from a Common Core text book, you will adapt it to fit the needs for exceptional learners. Make sure to describe the needs of the student(s) so as to “match” the adaptations to the needs. Include specific strategies that are designed to build the focus learners’ maintenance, generalization, and/or more independent performance of the task(s).The University lesson plan, the textbook lesson plan, or personal lesson plan format may be used. To be submitted to the instructor’s Dropbox. | End of week 6 |
| Weekly Threaded Discussions | 90 | These will be assigned from your readings. Answers should be based on content from the text with a minimum of 2 citations included. This should be 1-2 double-spaced, page(s). Responses to each of your peers are required. Late postings will result in loss of points. | Ongoing |

**Assessment:**

Your performance in this course will be assessed on the following:

**Attendance/Participation:** Full points will be awarded to those who turn in assignments on time, and who participate with enthusiasm, flexibility and respect, in discussions and activities.

**Weekly Discussions and Dropbox Assignments:**  Answers to the question related to the reading should be posted by the dates stated above. Full points will be awarded to papers that are submitted on time, are thorough in their responses, have a reflective section, and written to graduate standards of writing. These will be assigned from your readings. Answers should be based on content from the texts (citations included). Papers should be 1-2 double-spaced, page(s) for each discussion.

**Signature Assignment:**

To document candidates’ progress toward the mastery of the requisite knowledge, skills and dispositions for teacher licensure, all required courses have a signature assignment. Signature assignments are assessed via a rubric linked to the relevant program learning outcome(s). All signature assignments must be submitted on LiveText, where candidates may view their assessment results and any comments from the instructor. The signature assignment for this course is:

* Case Study Math Unit

**Grading Scale:**

A: 190-200 B: 180-189 C: 170 – 179

Anything under 170 points is not a passing grade and the class will have to be re-taken.

All written course assignments must follow American Psychological Association (APA) standards for writing student papers (See chapter six of APA manual).

WEEK 1

There are 5 questions:

\*Required reading from text: Chapters 1-4 (pages 1-83).

\*Responses to all Discussion Questions are required and please respond to two of your peers’ reflections also. Answers should be based on content from the text with a minimum of 2 citations included. This should be equivalent to about a one double-spaced page.

Week 1 Discussion Questions:

1. Introduce yourself in a short paragraph. Give the instructor an insight to what type of learner you are.
2. Go to the website by copying and pasting the following address:

https://www.teachingchannel.org/videos/math-test-grading-tips

This middle school math teacher shares how she uses mistakes to help students understand errors and learn from them (rather than it being a negative experience!) It is called “Highlighting Mistakes: A Grading Strategy”. After watching the video, share a one paragraph reflection of your thoughts.

1. There are certain characteristics that one needs to succeed as a teacher of mathematics. Name two of them, and explain why they are essential (related to textbook reading).
2. Name at least two examples of a tool that could help students to do mathematics and gain relational understanding of a concept. Describe a specific example of a way each tool could help develop this understanding (related to textbook reading).
3. Describe at least three different ways a teacher could provide support and challenge to meet any special student needs (related to textbook reading).

WEEK 2

\*Diagnosis and Remedial Plan:

(Attached). You will be presented students’ work from the different strands of mathematics. You will analyze these samples, diagnose errors and misconceptions, and determine instructional strategies to remediate the misunderstandings. You will then list strategies and give examples showing how you would ‘reteach’ and construct accurate meaning for the student. (1 page double spaced). To be submitted to the instructor.

\*Instruction and Assistive Technology Report:

Research instructional and assistive technologies (games, computer programs, web-based sites, school subscriptions, etc.) that help exceptional students acquire mathematical concepts and /or skills. A list of 4-6 items with a short descriptive paragraph of the uses and benefits of each item will suffice. Provide an example of how you might use them in your classroom. To be submitted to the instructor.

\*Required reading from text: Chapters 5-7 (pages 84-141).

\*Responses to all Discussion Questions are required as is a response to two of your peers’ reflections. Answers should be based on content from the text with a minimum of 2 citations included. This should be 1-2 double-spaced, page(s).

Week 2 Discussion Questions:

1. Provide at least two examples of potential writing prompts and how they could enhance students’ thinking about mathematics or be used for assessment.
2. Describe two strategies that could be used with students who display difficulties in math, such as those with mild disabilities or who fall into RTI tier 2, and an appropriate example of how each could be used with a student.
3. Describe in your own words the central ideas of culturally responsive mathematics instruction.

WEEK 3

\*Diagnosis and Remedial Plan:

(Attached). You will be presented students’ work from the different strands of mathematics. You will analyze these samples, diagnose errors and misconceptions, and determine instructional strategies to remediate the misunderstandings. You will then list strategies and give examples showing how you would ‘reteach’ and construct accurate meaning for the student. (1 page double spaced). To be submitted to the instructor.

\*Required reading from text: Chapters 8-11 (pages 142-246).

\*Responses to all Discussion Questions are required as is a response to two of your peers’ reflections. Answers should be based on content from the text with a minimum of 2 citations included. This should be 1-2 double-spaced, page(s).

Week 3 Discussion Questions:

1. Briefly describe a learning sequence that would help to develop an early number concept and/or number sense. Provide the name of the concept it would develop, a potential manipulative material that could be used, how it would develop this concept, and one way you might connect the activity to a real world application.
2. Describe at least four kinds of models one could use to model a multiplication or division situation.
3. Name two key ideas or strategies that can guide a teacher’s efforts to help older students who still struggle with basic facts, and describe briefly how each could be helpful.
4. Describe an activity that would help your students to better conceptualize numbers that are very large. Describe how this activity would build conceptualization.

WEEK 4

\*Problem Based Lesson Plan Using Children’s Literature

Using the *Literature Connections* as a resource (at the end of chapters 8-23 of the required textbook) or another children’s book which you know of related to math, you will choose a book and write a paragraph synopsis of the story. Then you will create a lesson plan having to do with problem solving using the *Three Phase Lesson Format* found in Chapter 4 of the required textbook. The book should be used as the *Before Phase* of the lesson. To be submitted to the instructor.

\*Diagnosis and Remedial Plan:

(Attached) You will be presented students’ work from the different strands of mathematics. You will analyze these samples, diagnose errors and misconceptions, and determine instructional strategies to remediate the misunderstandings. You will then list strategies and give examples showing how you would ‘reteach’ and construct accurate meaning for the student. (1 page double spaced). To be submitted to the instructor.

\*Required reading from text: Chapters 12-13 (pages 247-298).

\*Responses to all Discussion Questions are required as is a response to two of your peers’ reflections. Answers should be based on content from the text with a minimum of 2 citations included. This should be 1-2 double-spaced, page(s).

Week 4 Discussion Questions:

1. Provide an addition or subtraction problem and a potential student-invented strategy that could be used to compute it. Explain why a student-invented strategy could be valuable. Describe a method you could use to encourage the development and/or use of this method.
2. Provide a multiplication or division problem and a potential strategy that could be used to compute it. Explain why this strategy could be valuable. Describe an activity you could use to encourage the development and/or use of this method.

3. Which is an example of the *compensation* strategy and how do you know? Justify your answer.

a) 63 × 5 = 63 + 63 + 63 + 63 + 63 = 315

b) 27 × 4 = 20 × 4 + 7 × 4 = 80 + 28 = 108

c) 27 × 4 is about 30 (27 + 3) × 4 = 120; then subtract out the extra 3 × 4, so 120 –12 = 108

d) 46 × 3 = 46 × 2 (double) + 46 = 92 + 46 = 138

WEEK 5

\*Diagnosis and Remedial Plan:

(Attached). You will be presented students’ work from the different strands of mathematics. You will analyze these samples, diagnose errors and misconceptions, and determine instructional strategies to remediate the misunderstandings. You will then list strategies and give examples showing how you would ‘reteach’ and construct accurate meaning for the student. (1 page double spaced). To be submitted to the instructor.

\*Required reading from text: Chapters 15-17 (pages 339-428).

\*Responses to all Discussion Questions are required as is a response to two of your peers’ reflections. Answers should be based on content from the text with a minimum of 2 citations included. This should be 1-2 double-spaced, page(s).

Week 5 Discussion Questions:

1. Researchers have described a number of reasons that students have a tendency to struggle with fraction concepts. Name two of these reasons, and describe a method a teacher might use to address each.
2. Name two of the major guidelines to consider when developing computational strategies for fractions. Describe an instructional sequence that would support each guideline.
3. Name two methods that could help students develop the connection between fractions and decimals. Then describe how these methods develop conceptual understanding.

WEEK 6

\*Adapted Lesson Plan:

Using a traditional math lesson from a Common Core text book, you will adapt it to fit the needs for exceptional learners. Make sure to describe the needs of the student(s) so as to “match” the adaptations to the needs. Include specific strategies that are designed to build the focus learners’ maintenance, generalization, and/or more independent performance of the task(s). The University lesson plan, the textbook lesson plan, or personal lesson plan format may be used. It is easiest if you use a different color font and insert modifications, accommodations, and/or extra supports within the black font of the standard lesson plan. To be submitted to the instructor.

\*Diagnosis and Remedial Plan:

(Attached). You will be presented students’ work from the different strands of mathematics. You will analyze these samples, diagnose errors and misconceptions, and determine instructional strategies to remediate the misunderstandings. You will then list strategies and give examples showing how you would ‘reteach’ and construct accurate meaning for the student. (1 page double spaced). To be submitted to the instructor.

\*Required reading from text: Chapter 14 (pages 299-338).

\*Responses to all Discussion Questions are required as is a response to two of your peers’ reflections. Answers should be based on content from the text with a minimum of 2 citations included. This should be 1-2 double-spaced, page(s).

Week 6 Discussion Questions:

1. Describe two different ways you could determine whether a function is linear. Describe how these two methods relate to one another, and a possible classroom activity that would help students to see this connection.
2. Describe three different ways algebra can be connected to other areas of the mathematics curriculum.

WEEK 7

\*Diagnosis and Remedial Plan:

(Attached). You will be presented students’ work from the different strands of mathematics. You will analyze these samples, diagnose errors and misconceptions, and determine instructional strategies to remediate the misunderstandings. You will then list strategies and give examples showing how you would ‘reteach’ and construct accurate meaning for the student. (1 page double spaced). To be submitted to the instructor.

\*Required reading from text: Chapters 18-19 (pages 429-487).

\*Responses to all Discussion Questions are required as is a response to two of your peers’ reflections. Answers should be based on content from the text with a minimum of 2 citations included. This should be 1-2 double-spaced, page(s).

Week 7 Discussion Questions:

1. Construct an example of when confusing additive and proportional thinking could result in an incorrect answer. Describe an incorrect process that a learner might follow. Describe a correct way to find the solution and a way you might help the learner to see his error.
2. Name two strategies or methods for helping students to develop estimation skills. Describe how these strategies/methods would contribute to conceptual understanding.

WEEK 8

\*Diagnosis and Remedial Plan:

(Attached) You will be presented students’ work from the different strands of mathematics. You will analyze these samples, diagnose errors and misconceptions, and determine instructional strategies to remediate the misunderstandings. You will then list strategies and give examples showing how you would ‘reteach’ and construct accurate meaning for the student. (1 page double spaced). To be submitted to the instructor.

\*Required reading from text: Chapters 20-21 (pages 488-557).

\*Responses to all Discussion Questions are required as is a response to two of your peers’ reflections. Answers should be based on content from the text with a minimum of 2 citations included. This should be 1-2 double-spaced, page(s).

Week 8 Discussion Questions:

1. Describe one of the major content goals in geometry, why it is important, and an activity that could help students develop conceptual understanding of a topic that falls into this content goal.
2. Name two situations that could require data to be displayed. Choose the most appropriate data display format for each and explain the reasoning for your choice.
3. Provide two examples of questions that would help guide class discussions about data interpretation.

Explain how each question could help develop students’ ability to analyze data.

WEEK 9

\*Signature Assignment:

This is giving you a two week start!

This will be a case study on a focus learner from your O & P sessions. Create a math unit on one strand covered in the common core math standards on which your student is working on. It will contain three (3) to five (5) sequential lesson plans that cover the stages discussed in the text (exploratory or developmental, practice and application) that build upon one another. You will need to have **pre and post assessment data and samples of student artifacts**. In addition, your lesson should incorporate principles of the University Lesson Plan template (attached) to address diverse learners and have multiple ways to present material, engage the student and assess. Teaching methods should be evidence-based. To be submitted to the instructor.

\*Diagnosis and Remedial Plan:

(Attached) You will be presented students’ work from the different strands of mathematics. You will analyze these samples, diagnose errors and misconceptions, and determine instructional strategies to remediate the misunderstandings. You will then list strategies and give examples showing how you would ‘reteach’ and construct accurate meaning for the student. (1 page double spaced). To be submitted to the instructor.

\*Required reading from text: Chapters 22-23 (pages 558-607).

\*Responses to all Discussion Questions are required as is a response to two of your peers’ reflections. Answers should be based on content from the text with a minimum of 2 citations included. This should be 1-2 double-spaced, page(s).

Week 9 Discussion Questions:

Describe two activities that can help develop probability concepts for students.

Describe an activity that could help students gain a conceptual understanding of a real number concept.

The classic “Monty Hall Problem” is a favorite for studying probability. In the game show, one of the three doors has a big prize. The contestant guesses one door, but before revealing what is behind that door, Monty shows the contestant a goat behind one of the doors not selected. Then he offers the contestant the opportunity to switch doors. Does the contestant have a better chance of winning the big prize by *switching* or *staying* with the original choice (or does it not matter)? There are numerous methods of answering this question. Make a convincing argument for your own answer based on the ideas and techniques of Chapter 22.

WEEK 10

\*Signature Assignment:

This will be a case study on a focus learner from your O & P sessions. Create a math unit on one strand covered in the common core math standards on which your student is working on. It will contain three (3) to five (5) sequential lesson plans that cover the stages discussed in the text (exploratory or developmental, practice and application) that build upon one another. You will need to have **pre and post assessment data and samples of student artifacts.** In addition, your lesson should incorporate principles of the University Lesson Plan template (in DocShare) to address diverse learners and have multiple ways to present material, engage the student and assess. Teaching methods should be evidence-based. To be submitted to the instructor.

Week 10 Discussion Question:

1. Share a couple of “ah-ha” discoveries you made during this class and say aloha to your peers! Thank you for a great class!