

15800 Calvary Rd
Kansas City, MO 64147

Course: ED 345 D & ND Teaching Elementary Mathematics I
Credit: 3 credit hours
Semester: Spring, 2022 (Cycle 4) January 10 – March 4
Time: 8:00 – 11:00 a.m. on Tuesdays
Instructor: Karen Hange
Location: East Education, Room 125
Contact Info: Office phone: 816-425-6186 Email: karen.hange@calvary.edu

I. DESCRIPTION

This course will introduce the foundational educational principles of mathematics instruction including the development of a comprehensive mathematics program aligned to Missouri Learning standards. Students will learn to make connections between learning theories and mathematics instruction, design investigative instructional activities, integrate technology, develop cross-curricular connections, and analyze student understanding through assessment practices. Strategies for developing critical thinking and problem solving in mathematics will be developed. Consideration is given to curriculum development, differentiated instructional planning, instructional technology, and English language learners. (Prerequisite: ED190 or permission from the Education Department program director; must be officially admitted to Teacher Education program)

This is a blended class, meaning that both campus and online students take this class together. Campus students attend the classes in person, online students attend the classes via the online classroom. All interaction and assignments for campus and online students are done in the online classroom.

II. DEPARTMENTAL THEME STATEMENT

The Educator Preparation program at Calvary promotes the development of teachers within a distinctly Christian environment grounded in a Biblical philosophy of education. The program emphasizes pedagogical skills, differentiated learning, diversity appreciation, instructional technology and a search for truth while setting standards for professionalism and character for each teacher candidate. Students should graduate with a desire to be lifelong learners and servant-leaders.

III. OBJECTIVES

A. General competencies to be achieved. The student will:

1. Recognize the central concepts, structures, and **tools of inquiry in the mathematics discipline** to create learning experiences that are meaningful and engaging for all students.
 - a. PLO-2, 3, 6; MTS-1, 3, 4
 - b. Assignments: A1, A2, B1, B4, B5
2. Analyze how students learn, develop, and **differ in their approaches to learning**.
 - a. PLO-2, 4, 5, 6; MTS-2, 5
 - b. Assignments: A3, B2, B3
3. Connect instruction to culture and community; synthesize a comprehensive and consistently **biblical worldview of elementary mathematics**.
 - a. PLO-1, 2, 4; MTS-2, 5, 6
 - b. Assignments: B5, B6

B. Specific competencies to be achieved. The student will:

1. Evaluate and utilize contemporary **mathematics standards and curriculum** materials for mathematics education as articulated by NCTM guidelines and the MO Learning Standards.
 - a. PLO-2, 6; MTS-1, 3
 - b. Assignments: A1, A2, B4, B5, B6
2. Evaluate research-based models of **critical thinking and problem-solving**, including various types of instructional strategies such as: teaching from the concrete to the abstract and using manipulatives and pictorial math models to support student engagement in higher level thinking skills.
 - a. PLO-2, 4; MTS-4
 - b. Assignments: A2, A3, B2, B4
3. Understand individual/group motivation and behavior to create a learning environment that encourages **active engagement** in learning, facilitating **cooperative learning** through math lessons, develop positive social interaction, and self-motivation.
 - a. PLO-1, 2, 4; MTS-5
 - b. Assignments: A3, B1, B3, B6
4. Analyze effective **technology applications** to foster active inquiry, collaboration, and supportive interaction in the classroom.
 - a. PLO-3, 5; MTS-6, 7
 - b. Assignments: A2, B4, B6
5. Create an **effective learning environment**, promote student interest and learning, and include techniques to manage time, space, transitions, and activities that support the individualized learning levels of students.
 - a. PLO-2, 3, 4, 6; MTS-5, 8
 - b. Assignments: A1, A3, B1, B5, B6

IV. MATERIALS required for this course:

A. Bible (see note below in course policies)

B. Textbooks

Tipps, Steve, Art Johnson, and Leonard M. Kennedy. *Guiding Children's Learning of Mathematics, 13th edition*, Boston, MA: Cengage Learning, 2018. (ISBN: 978-1-305-96066-4)

This course will require MindTap from Cengage. **You must purchase through Cengage...do not try to purchase through Amazon or buy a used copy of this textbook!**

MindTap is a learning platform that will include videos, quizzes and other activities specifically for this course through Cengage Unlimited. **You may also request a print copy of the textbook and extend use beyond the subscription dates**

Cengage Unlimited costs \$119.99 for four months which will cover access for both this course and ED 434. To get started visit: **Cengage Start Strong Website** at <https://startstrong.cengage.com> for step-by-step instructions.

*Temporary Access: You can access your MindTap course until 6:00 AM (UTC) on 1/23/2022 for free. At the end of the temporary access period, you will be prompted to purchase access. Your work will be saved and will be available to you again once you've completed your purchase. link that explains more: <https://www.cengage.com/student/>

Other

National Council of Teachers of Mathematics website: <http://www.nctm.org/>

The NCTM is a voice of mathematics education, providing vision, leadership, and professional development to support teachers in ensuring mathematics learning of the highest quality for all students. The Council's "Principles and Standards for School Mathematics" are guidelines for excellence in mathematics education and issue a call for all students to engage in more challenging mathematics.

Missouri Learning Standards for Mathematics

<https://dese.mo.gov/media/pdf/curr-mls-standards-math-k-5-sboe-2016>

These are the Learning standards created by the Department of Elementary and Secondary Education for the state of Missouri. These goals ensure that all teachers in Missouri are guided by the same goals to promote equity across the state. DESE supports Missouri school districts as they develop coherent and focused standards-based mathematics standards that improve classroom instruction.

Journals in JSTOR from National Council of Teachers of Mathematics

Journal for Research in Mathematics Education	1970 - 2019
Journal for Research in Mathematics Education. Monograph	1985 - 2008
The Mathematics Teacher	1908 - 2019
Mathematics Teacher Educator	2012 - 2018
Teaching Children Mathematics	1994 - 2019
The Arithmetic Teacher	1954 - 1994

JSTOR is currently offering a free trial to students with individual registration that allows access to 100 articles through June, 2022.

V. REQUIREMENTS

A. Weekly Assignments

1. Reading

Read the assigned textbook according to the reading schedule provided in the Tentative Class Schedule. Reading the text thoroughly will provide a context for class discussion and activities. There will be one chapter to complete each week.

2. Cengage Activities & Video responses

Each chapter in the textbook will include some video activities, quizzes and occasionally a classroom scenario assignment based upon the material in the chapter. Students will access these activities through CANVAS and CENGAGE.

3. Discussion Posts

An article or media file will be posted each week through CANVAS. After reviewing the posted prompt, students will write a 250-300 word response that promotes further reflection or dialogue. Students must also read the responses from their peers and provide meaningful feedback to prompt further inquiry and discussion.

B. Course Projects

1. Observe an elementary Mathematics class & Interview the teacher

Visit an elementary classroom and interview the teacher regarding specific challenges that arise when teaching math. Spend about an hour for the observation and a minimum of 30 minutes for the interview. Write a 500-word summary of your reflections and take-aways.

Make note of the following items during the observation:

- Curriculum/Textbook used
- Posters or visuals in the classroom that highlight math content
- Supplemental resources available for individual student use
- Classroom management strategies & participation techniques utilized to enhance student engagement.
- Difficulties that are math-specific in the classroom.

2. Math & Literacy Book Reviews

Read and review 20 children's books that could be used to introduce math topics. Each chapter in the textbook ends with a list of recommended children's books. A template for this assignment will be included in CANVAS.

3. Portfolio of Tools & Manipulative – 20 tools based on Missouri Math Standards

Number Sense and Operations in Base Ten
Number Sense and Operations in Fractions
Relationships and Algebraic Thinking
Geometry and Measurement
Data and Statistics

Identify four specific tools or manipulatives for each category that can be used to increase effectiveness and support student learning. Tools may be teacher-created or commercially-produced items. A template for this assignment will be provided on CANVAS.

4. **Research Paper: Issues in Math Education—Defend a position**

Students will research a topic that pertains to current issues in the area of mathematics instruction and write a **1,500-word essay** that describes the different perspectives of the issue. Students will select a “side” of the issue and defend their reasoning with support from at least three academic sources. **Students will present a 5-minute “elevator” speech with Powerpoint (5 slides) to explain the issue to their classmates.** This assignment will be submitted through TurnItIn via CANVAS with a similarity score of less than 15%. A reference page will need to be included to give evidence of research with 3 academic sources. Possible topics could include:

- Common Core Math Standards...have we “dumbed” down the curriculum?
- Math Homework...is it necessary?
- Memorizing math facts...should it be a requirement in an age of technology?
- Inquiry-Based vs. Traditional Approach...is it important to know the ‘why’ of math?
- Problem-Solving & Algebraic Thinking...should creativity be valued in math instruction?

5. **Mathematics Unit Plan & Teaching Practice**

See template provided on CANVAS. Include the following elements:

- Grade level & Math topic
- Select standards from MO Learning Standards to cover in the unit.
- Write out the learning objectives based on the **standards as “I Can” statements.**
- Include instructional plans that cover the following aspects: Number representation, Concept development, Exploratory activities, Direct instruction, Guided practice, and Independent reinforcement.
- Scope and Sequence...what will be taught and when it will be taught
- **Create 4 detailed Daily Lesson Plans—1 to introduce the unit, 2 from the middle, and 1 from the end to review/summarize the unit.**
- Differentiation: for English Language Learners, Learning Challenged, Academically Gifted/Talented, Physically Challenged, etc.
- Include integration: Biblical principles, writing, art, music, P.E., etc.
- Design a bulletin board to enhance understanding of topic. (Diagram only).
- Include one Activity or Learning center idea
- Include one Website or App to support the theme

VI. **METHODS**

A. **Teaching**

1. Lectures
2. Small and large group discussion
3. Research and reading
4. Projects
5. Writing
6. Practicing skills

B. Grading

1. Weight given to assignments:

Classroom observation & interview	50 points
Math & Literacy Book Reviews	100 points
Math Tools & Manipulatives Collection	100 points
Math Issues Position Paper & Presentation	150 points
Mathematics Unit plan & teaching demo	200 points
Weekly quizzes & Cengage activities	30 points each over 8 weeks
Weekly Discussion posts	<u>20 points each over 8 weeks</u>
Total points for the class	1000 points

2. Late Assignments

Late assignments may be penalized at the discretion of the instructor.

3. Letter / Numerical Grade Scale

The grading scale listed in the current University Catalog will be used for this course.

VII. COURSE POLICIES

A. Grade Requirements

Education majors must maintain a high standard for GPAs to successfully complete their program. Education majors must maintain a 3.0 GPA in Professional Education and Content Area coursework. *This course must be passed with a grade of "C" or higher depending on the student's GPA in Professional and Content Area courses. Receiving a grade lower than a "C" will mean that this course must be repeated.*

B. The Bible as Required Textbook

The Bible is a required textbook in every course at Calvary University. To facilitate academic level study, students are required to use for assignments and research an English translation or version of the Bible based on formal equivalence (*meaning that the translation is generally word-for-word from the original languages*), including any of the following: New American Standard (NASB), English Standard Version (ESV), New King James (NKJV), or King James (KJV). Other translations and versions based on dynamic equivalence (*paraphrase and thought-for-thought translations like NLT and NIV*) may be used as supplemental sources. Please ask the professor if you have questions about a particular translation or version.

C. Academic Honesty

Plagiarism is defined as copying any part of a book or paper without identifying the author. This also includes taking another person's ideas and presenting them as your own. All papers must be submitted in APA format and submitted to Turnitin prior to uploading onto Canvas.

D. Attendance

You are expected to attend class unless you have a reasonable excuse that has been cleared by the instructor. When absent, you must listen to the video recording and send in a summary of what was presented. More than 1 absence may be cause for being dropped from the class. Punctuality is expected—a student arriving more than 15 minutes late will be marked absent.

E. Class Participation

Students are expected to attend class and participate in discussing the daily material. Learning takes place best when the student is personally involved in the process. Cell phones should be set to silent and placed on the table or in a backpack/purse. *Working on other assignments during class or using electronic devices for anything other than class activities or taking notes for the course will not be permitted.*

F. Accommodations Statement

Students with disabilities have the responsibility of informing the Accommodations Support Coordinator (aso@calvary.edu) of any condition that may require support.

G. Style Guide

All class papers must follow the APA style guide according to *Publication Manual of the American Psychological Association*, 7th edition.

H. The Clark Academic Center

The Clark Academic Center (learning@calvary.edu), located in the library building, is dedicated to providing free academic assistance for all Calvary University students. CAC assists with all facets of the writing process, tutors in various subject areas, prepares students for exams, facilitates with time management options and proctoring of tests. Please take advantage of this service.

About Changes to this Syllabus: The instructor reserves the right to make changes to this syllabus at any time during the course, but any change made will only be done after clearly communicating the need for the change and the specific change to be made via in-class announcement and Canvas announcement.

VIII. TENTATIVE SCHEDULE

Week	Dates	Class Topics	Assignments
1	01/11	Elementary Math for the 21 st Century: Chapters 1 & 2	Looking ahead to future assignments
2	01/18	Mathematics for Every Child: Chapter 3	
3	01/25	Learning Mathematics: Chapter 4	Due: Math & Literacy Book review
4	02/01	Organizing Instruction: Chapter 5	Due: Research Paper & Powerpoint presentation
5	02/08	Integrating Assessment: Chapter 6	Due: Math Tools & Manipulatives Portfolio

6	02/15	Developing Problem-Solving Strategies Chapter 7	Work ahead for Unit Plan
7	02/22	Developing Concepts of Number Chapter 8	Due: Observation & Interview reflection
8	03/01	Extending Number Concepts & Number Systems Chapter 9	Due: Unit Plan & Teaching Demonstration

IX. BIBLIOGRAPHY - The following are resources recommended for further study.

Burns, M. (1998). Math: Facing an American phobia. Sausalito, CA: Math Solutions Publications.

Selected Children's Books Linking Mathematics and Literature

Adler, D. A. (1996). Fraction fun. New York: Holiday House.

Adler, D. A. (1999). How tall how short how far away. New York: Holiday House.

Hirsch, C. F. & Chesters, L. (2004). I.M. Pei: A life in architecture. Barrington, IL: Rigby.

Long, L. (1996). Domino addition. Watertown, MA: Charlesbridge Publishing.

LoPresti, A. S. (2003). A place for zero: A math adventure. Watertown, MA: Charlesbridge Publishing.

McGrath, B. B. The M&M's brand counting book. Watertown, MA: Charlesbridge Publishing.

Neuschwander, C. (1997). Sir Cumference and the first round table. Watertown, MA: Charlesbridge Publishing.

Neuschwander, C. (2003). Sir Cumference and the sword in the cone. Watertown, MA: Charlesbridge Publishing.

Pallotta, J. & Bolster, R. (1999). The Hershey's milk chocolate fractions book. New York, NY: Scholastic, Inc.

Pallotta, J. & Bolster, R. (2002). The Hershey's milk chocolate weights and measures. New York, NY: Scholastic, Inc.

Schwartz, D. M. How much is a million?. New York, NY: A Mulberry Paperback Book.

Shulman, L. (2004). Making pizza with math. Barrington, IL: Rigby.

Slater, T. (1996). Just a minute!. New York, NY: Scholastic, Inc.

Steinbock, E. (2004). Circles everywhere. Barrington, IL: Rigby.

Williams, R. L. (2001). The coin counting book. Watertown, MA: Charlesbridge Publishing.