

**CALIFORNIA STATE UNIVERSITY SAN MARCOS
COLLEGE OF EDUCATION**

EDMS 543 –Elementary Mathematics Education (3 Units)

CRN 41455, Fall 2009

Tuesday: 8:00 AM – 2:45 PM, Room 48 at Alvin Dunn Elementary School

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Office Hours: Before/after class or by appt.

College of Education Mission Statement

The mission of the College of Education Community is to collaboratively transform public education by preparing thoughtful educators and advancing professional practices. We are committed to diversity, educational equity, and social justice, exemplified through reflective teaching, life-long learning, innovative research and on-going service. Our practices demonstrate a commitment to student-centered education, diversity, collaboration, professionalism, and shared governance. (*Adopted by COE Governance Community, October, 1997*).

COURSE DESCRIPTION

EDMS 543 focuses on curriculum development, methods, techniques, materials, planning, organization and assessment in various elementary school curricula, and curriculum integration. Methods of cross-cultural language and academic development will be integrated into the course. The course requires participation/observation in the public schools.

Course Objectives

Learning to teach mathematics well is challenging and, therefore, this course will only begin your education in learning how to teach mathematics. This course is but one stage in your process of becoming a mathematics teacher. We are expected to: (a) deepen our understanding of the mathematics taught at the elementary level, including such topics as place value, base systems, number theory, fractions, proportions, statistics, and algebra, (b) develop an understanding of the current issues and practices in mathematics education, (c) develop a familiarity with the NCTM and California learning standards, (d) develop an understanding of children's content specific thinking, (e) learn to teach content specific concepts using effective and appropriate strategies, including the educational use of technology, (f) practice how to teach for mathematical understanding, and (g) develop strategies to create a classroom environment that promotes the investigation and growth of mathematical ideas and to ensure the success of all students in multi-cultural settings.

Course Prerequisites

- Admission to the Multiple Subject/BCLAD Teacher Credential Program

Required Texts

- Van de Walle, J. A., Karp, K. M., & Bay-Williams, J. M. (2010). *Elementary and middle school mathematics: Teaching developmentally* (7th ed). Boston: Allyn & Bacon.
- California Department of Education (2006). *Mathematics framework for California public schools, kindergarten through grade twelve* (2006 Revised Ed.). Sacramento, CA: Author. This document can be found on the WWW at: <http://www.cde.ca.gov/ci/ma/cf/documents/mathfrwkcomplete.pdf>. The Web site contains a downloadable PDF file. There are also copies in the library for checkout.

You are required to access the following Web sites and materials for this course.

- National Council of Teachers of Mathematics (2000). *Principles and standards for school mathematics*. Reston, VA: Author. An overview of this document can be found at: <http://standards.nctm.org/document/index.htm>
- Star Test Blueprints for Standards Items (grades 2-7) <http://www.cde.ca.gov/ta/tg/sr/documents/math1105.doc>

Recommended Materials

- Carpenter, T. P., Fennema, E., Franke, M. L., Levi, L., & Empson, S. B. (1999). *Children's mathematics: Cognitively guided instruction*. Portsmouth, NH: Heinemann.

- Carpenter, T. P., Franke, M. L., & Levi, L. (2003). *Thinking mathematically: Integrating arithmetic & algebra in elementary school*. Portsmouth, NH: Heinemann.
- Lampert, M. (2001). *Teaching problems and the problems of teaching*. New Haven, CT: Yale University Press.
- Burns, M. (2007). *About teaching mathematics: A K-8 resource* (3rd ed.). Sausalito, CA: Math Solutions Publications.

INFUSED COMPETENCIES

Special Education

Consistent with the intent to offer a seamless teaching credential in the College of Education, this course will demonstrate the collaborative infusion of special education competencies that reflect inclusive educational practices.

Authorization to Teach English Learners

The CSUSM credential program has been specifically designed to prepare teachers for the diversity of languages often encountered in California public school classrooms. The authorization to teach English learners is met through the infusion of content and experiences within the credential program, as well as additional coursework. Students successfully completing this program receive a credential with authorization to teach English learners. *(Approved by CCTC in SB 2042 Program Standards, August 02)*

Technology

This course infuses technology competencies to prepare candidates to use technologies, emphasizing their use in both teaching practice and student learning. Students are expected to demonstrate competency in the use of various forms of technology (i.e., word processing, electronic mail, WebCT 6, use of the Internet, and/or multimedia presentations). Specific requirements for course assignments with regard to technology are at the discretion of the instructor. Please keep a digital copy of all assignments.

COURSE POLICIES

College of Education Attendance Policy

Due to the dynamic and interactive nature of courses in the College of Education, all students are expected to attend all classes and participate actively. Absences and late arrivals/early departures will affect the final grade. At a minimum, students must attend more than 80% of class time, or s/he may not receive a passing grade for the course at the discretion of the instructor. Individual instructors may adopt more stringent attendance requirements. Should the student have extenuating circumstances, s/he should contact the instructor as soon as possible. *(Adopted by the COE Governance Community, December, 1997).*

For this course, if you miss two sessions, you will not receive a grade of A. If you miss three sessions, your highest possible grade is a B. If you miss four sessions, your highest possible grade is a C+. If you miss more than four sessions, you will receive a grade lower than a C+, which is considered to be unsatisfactory in a credential program. Attendance will be taken at each class session. (A session is defined as one half day of instruction. In other words, each Tuesday we have a morning session and an afternoon session).

If possible, please discuss with the instructor any extenuating circumstances that will cause you to miss class prior to your absence. Absence is no excuse for not turning in assignments, as they may be sent electronically to the instructor if an absence arises or is anticipated. **NOTE: With few exceptions, late assignments will not be accepted.**

All University Writing Requirement

In keeping with the All-University Writing Requirement, all 3-unit courses must have a writing component of at least 2,500 words (approximately 10 pages), which can be administered in a variety of ways. Writing requirements for this course will be met as described in the assignments.

Computer Use During Class Sessions

You are welcome to use a laptop computer in class when working on class assignments, for example. However, you will need to save checking email or other personal computer use for time outside of class. Most students find it disruptive when they are focusing on class activities or listening to presentations and can hear keyboarding in the classroom. Your kind consideration is greatly appreciated by all!

Person-First Language

Use “person-first” language in all written and oral assignments and discussions (e.g., “student with autism” rather than “autistic student”). Disabilities are not persons and they do not define persons, so do not replace person-nouns with disability-nouns. Further, emphasize the person, not the disability, by putting the person-noun first.

Students With Disabilities Requiring Reasonable Accommodations

Students must be approved for services by providing appropriate and recent documentation to the Office of Disabled Student Services (DSS). This office is located in Craven Hall 5205, and can be contacted by phone at (760) 750-4905, or TTY (760) 750-4909. Students authorized by DSS to receive reasonable accommodations should meet with their instructor during office hours or, in order to ensure confidentiality in a more private setting.

CSUSM Academic Honesty Policy

“Students will be expected to adhere to standards of academic honesty and integrity, as outlined in the Student Academic Honesty Policy. All written work and oral presentation assignments must be original work. All ideas/materials that are borrowed from other sources must have appropriate references to the original sources. Any quoted material should give credit to the source and be punctuated with quotation marks.

Students are responsible for honest completion of their work including examinations. There will be no tolerance for infractions. If you believe there has been an infraction by someone in the class, please bring it to the instructor’s attention. The instructor reserves the right to discipline any student for academic dishonesty in accordance with the general rules and regulations of the university. Disciplinary action may include the lowering of grades and/or the assignment of a failing grade for an exam, assignment, or the class as a whole.”

Incidents of Academic Dishonesty will be reported to the Dean of Students. Sanctions at the University level may include suspension or expulsion from the University.

Plagiarism

As an educator, it is expected that each student will do his/her own work, and contribute equally to group projects and processes. Plagiarism or cheating is unacceptable under any circumstances. If you are in doubt about whether your work is paraphrased or plagiarized, see the Plagiarism Prevention for Students website <http://library.csusm.edu/plagiarism/index.html>. If there are questions about academic honesty, please consult the University catalog.

STUDENT LEARNING OUTCOMES

Teacher Performance Expectation (TPE) Competencies

The course objectives, assignments, and assessments have been aligned with the CTC standards for the Multiple Subject Credential. This course is designed to help teachers seeking a California teaching credential to develop the skills, knowledge, and attitudes necessary to assist schools and district in implementing effective programs for all students. The successful candidate will be able to merge theory and practice in order to realize a comprehensive and extensive educational program for all students.

California Teacher Performance Assessment (CalTPA)

Beginning July 1, 2008 all California credential candidates must successfully complete a state-approved system of teacher performance assessment (TPA), to be embedded in the credential program of preparation. At CSUSM, this assessment system is called the CalTPA or the TPA for short.

To assist your successful completion of the TPA a series of informational seminars are offered over the course of the program. TPA related questions and logistical concerns are to be addressed during the seminars. Your attendance to TPA seminars will greatly contribute to your success on the assessment.

Additionally, COE classes use common pedagogical language, lesson plans (lesson designs), and unit plans (unit designs) in order to support and ensure your success on the TPA and more importantly in your credential program.

The CalTPA Candidate Handbook, TPA seminar schedule, and other TPA support materials can be found on the COE website provided at the website provided: <http://www.csusm.edu/coe/CalTPA/StudentInfoTPA.html>

COURSE REQUIREMENTS/ASSIGNMENTS

Each written assignment is expected to have a clear organizational presentation and be free of grammar, punctuation and spelling errors. There will be a reduction in points for the above mentioned errors. Late assignments will not be accepted. Prepare carefully for class, be ready to discuss readings and assignments thoughtfully and actively participate in all class activities.

Detailed assignment guidelines and scoring rubrics will be given in class or at the course WebCT.

Participation and Professionalism (10 points)

You are expected to actively participate in discussions, group work, presentations, and hands-on activities throughout the course. A positive professional disposition includes a willingness to consider and discuss new ideas objectively, curiosity, perseverance, and seriousness about improving one's self as a teacher. It can also include a sense of humor and social intelligence (e.g., the tact and ability to make others feel comfortable and to contribute).

Reading Accountability: Reflection Papers and Classroom Activities (25 points)

The first reflection paper pertains to your prior experience with mathematics. Details will be given in class.

In addition, you need to do 5 reflection papers/activities. You will either:

- 1) Write a "meaningful" reflection paper on (a) the text material assigned to be read for that week, or (b) a pressing issue in mathematics education per the instructor's guidelines.

OR

- 2) Engage in classroom activities that are designed for students to demonstrate their understanding and share your thoughts

Each paper should clearly articulate your thoughts on the assigned readings. In your reflections, you are encouraged to make connections with your teaching/learning experience and your field experience (e.g., your observation of elementary school classroom activities). You can also raise questions for discussion and/or discuss how you might specifically apply what you learned from the articles as a teacher in the classroom. Do not repeat verbatim from the readings. Other written assignments may be given that will substitute the written reflection but not the reading assignment.

Student Interviews (20 points)

You will conduct two different student interviews based on questions provided in class. Each interview is worth 10 points. For each interview, you will pose mathematical problems to any one student at a predetermined grade level. The purpose is to get you to begin thinking about students' mathematical understanding, to learn how to effectively pose questions, interpret the meaning of students' responses, and to provide you with an opportunity to interact with students. For each interview, you need to submit a report of no more than two pages. Please include the child's written work. You may work with a peer in the interviewing process, but each needs to write his/her own report. In addition, you may need to share/present your interview findings in class.

Mathematical Lesson Design (35 points)

The purpose of this assignment is to help you learn how to design effective mathematical activities and lessons and to provide an opportunity for you to practice teaching mathematics. Working in small groups of 2-3 members, your team will design one standards-based lesson (approximately 40 mins in length) that you will present in an elementary school class. A draft of the lesson should be submitted for review before the lesson is taught to students. More specific details will be given in class. The lesson plan template is attached to this syllabus.

Mathematics Learning Center Activity (10 points)

The class will form groups of 5-6 members, and each group will be assigned a mathematical area in the elementary school curriculum (see course schedule). Each group member needs to design a 5-10 minute learning activity in the assigned area and then teach the activity in our EDMS 543 class. In addition, you need to write a detailed description of the learning activity and provide teaching tips for your activity (so that, for example, a sub

teacher can follow). You need to go through the activity checklist (will be provided in class) and ensure that the activity is appropriate and beneficial to the class. Your activity will be posted on the appropriate thread of the discussion board on WebCT, where a collection of approximately 30 learning activities will be available for your future teaching.

GRADING SCALE: Grades for this course will be based on the following grading scale:

A = 93% - 100 % A- = 90% - 92% B+ = 87% - 89% B = 83% - 86 % B- = 80% - 82%

C+ = 77% - 79% C = 73% - 76 % C- = 70% -72% D = 60% - 69% F = below 60

Lesson Design Elements

Group Members:

Elements of the learning experience

Lesson Title: What is the title of your lesson?

Grade Level:

Content Area: *Mathematics*

Subject Matter: *Number Sense, Measurement and Geometry, Algebra and Functions, Statistics, Data Analysis and Probability, Mathematical Reasoning*

Time period for the learning experience *Example: two 30 minute sessions Science*

California Mathematics Content Standards: *State-adopted content standards*

Lesson objective(s) based on the content standards:

Mathematical Concept(s): What are you trying to teach? What big idea(s) is/are the focus of your lesson? Do not say, "The students will _____." (That is an objective, not a concept.)

Example: In the set model for fractions, the whole is understood to be a set of objects and subsets of the whole make up fractional parts

Class Description - For the purpose of this assignment, the class description must include English Learners, Special Education students and GATE students. Individualize this section based on your own assigned classroom.

Type of class (self contained, subject specific), time of year, general background of students learning in relationship to new learning (challenges and prior learning)

English Learners:

Special education:

GATE student:

Regular education:

Materials/Resources/Technology: *What does the teacher need? What do the students need? Materials should include lists of supplies that will be needed to present this lesson.*

Assessment Plan

Note: Goals/objectives that will be assessed are based on the content standards and are tied to the Big Idea(s) (concepts) in your lesson.

Types of assessment: Prior knowledge (pre assessment), Formative (progress monitoring), Summative

(final product)

Description and Purpose of each Assessment Type listed above

Feedback strategies: How students will be informed of specific successes and challenges?

How general assessment results will be used to inform instruction:

Criteria for Assessment

What benchmark criteria will you use to grade the assessment? How will you know if a student has successfully completed the assessment and accomplished the learning goals? What will they do to show you they have succeeded?

NOTE: Criteria are based on the mathematics content standards and the learning goals/objectives in your lesson.

Lesson Activities: Address the subject matter lesson objectives and developmental needs of the students described.

Instructional Strategies- <i>What the <u>teacher</u> does during the instruction.</i>	Student Activities – <i>What the <u>students</u> do during the lesson.</i>
LAUNCH How will you set up the problems or mathematical tasks? How will you motivate and focus students? What will you establish expectations?	
EXPLORE How will you help students explore the math concepts in the lesson? How will you promote students' conceptual understanding? How will you check for students' understanding? What difficulties may be seen? What questions can you ask to guide students' thinking? What are the accommodations and modifications for students who may struggle?	
SUMMARIZE/SHARE Closure: How will you have students summarize their learning? How will you encourage students to share their learning and provide comments to other students' findings? What questions can you ask to encourage students to draw conclusions? How will you structure opportunities for students to continue developing understanding and skills after the lesson?	

Description & Purpose of Differentiated/Adapted Instructional Methods for ONE of the following students:

- *English Learner*
- *Learner with Special Needs*
 - *Learning Disability*
 - *Physical Disability*
- *GATE Student/Advanced Learners/Accelerated Learner*

Rationale for Instructional Strategies:

1. Why are the instructional strategies, student activities and resources appropriate for this class, based on content and student development?
2. How do they help the students make progress toward achieving the state adopted academic content standards in this content area?

LESSON DESIGN ASSIGNMENT GRADING RUBRIC

EDMS 543

Design Component & Criteria	Approaching	Meets (includes the criteria for Approaching)	Exceeds (includes the criteria for Approaching & Meets)
Part I. Elements of Learning Experience (4 points)			
Title, Grade Level, & Time 0.5 point	Provides a title that is related to the lesson activity; provides grade level and time allocation ...	& title addresses the math concepts in the lesson; appropriate grade level and time allocation ...	& describes where the title fits within a unit plan.
CA Standards and Lesson-specific Learning Objectives 1 points	CA Standards are identified and each is addressed in a learning objective or a set of objectives ...	& each learning objective is clearly stated in terms of what students are expected to know and do ...	& identifies which of the three facets of mathematics learning (procedural proficiency, conceptual understanding, & problem solving) each learning objective is designed to address.
List of materials 0.5 point	Provides a list of materials ...	& the materials are appropriate...	& effective materials that help achieve the learning objectives; if uncommon materials are used, describes how to obtain and/or produce them.
Class Description 2 points	Provides the class demographic information; describes students' prior knowledge & experience...	& includes developmental needs of the students...	& includes ALL groups of students who present a different instructional challenge (ELL, Special Ed, GATE, etc.) and their particular learning needs.
Part II. Assessment Plan (5 points)			
Assessment Strategies 3 points	Provides assessment strategies for each objective ...	& articulates if each strategy is <i>formative or summative</i> (or other type) assessment; clearly describes what will be assessed and how you will conduct each of the assessment tasks ...	& provides multiple opportunities for the instructor to check for understanding.
Expectations & Rubrics 2 points	Provides rubrics for assessing student learning ...	& clearly communicates to students about the expectations ...	& justifies the use of holistic or analytical (or mixed) approach to rubric design.
Part III. Instructional Strategies (15 points)			
The Launch Phase 5 points	Provides an introduction to the lesson ...	& effective introduction that motivates students, challenging/interesting problem(s) that orient student thinking ...	& establishes expectations and provides script for teacher and times for each activity.
The Explore Phase 5 points	Describes how you will help students explore the math concepts in the	& details the steps that build students' conceptual	& provides script for teacher and times for each activity; predicts

	lesson ...	understanding (cognitively demanding tasks instead of merely rule-oriented drill); provides hints/assists and questions you might give as students work ...	what might happen, provides accommodations and modifications for students who may struggle.
The Summarize Phase 5 points	Describes how you will wrap up the lesson ...	& clearly describes how you will format the discussion of the learning task, what questions will you ask to encourage students to draw conclusions and to extend their thinking, etc. ...	& provides strategies for increase students' reflection and meta-cognition.
Part IV. Differentiation Strategies (5 points)-- Choose ONE group of students who present a different instructional challenge such as ELL, GATE, Special education, etc.)			
Differentiation 5 points	Describes the differentiation strategy for the chosen group of students...	& articulates how the strategy addresses the students identity and developmental needs (readiness, interest or learning profile)...	& provides how the strategy will be assessed for effectiveness and altered if needed.
Part V. Rationale & Reflection (6 points)			
Rationale 3 points	Describes the rationale for teaching this lesson (big ideas, enduring understandings, essential questions) ...	& addresses how the instructional strategies and the student activities are suited to meet the standard(s) and objective(s) of the lesson...	& explains how the assessment is a valid and reliable way to assess student learning.
Reflection 3 points	Reflects on what works and what does not work...	& includes an in-depth analysis of students' learning outcomes...	& provides specific and effective strategies for improving the lesson.

Total: 35 points. **Due date: October 13th, 2009.**

CSUSM Furloughs

Due to the devastating effects of current budget crisis in California, I have been furloughed nine days each semester of this academic year, representing a 9.23% reduction in both workload and compensation. A furlough is an unpaid day off on a faculty member's regularly-scheduled workday. In order to satisfy legal and ethical requirements of the California Labor Code, I am required to submit formal certification that I will not work on my furlough days. I am prohibited from teaching, conducting scholarly research, consulting with students, responding to email or voicemail, providing assignment feedback, or participating in any CSU work-related activities on my furlough days. Furlough dates vary by professor; my Fall Semester furlough dates are 9/3, 9/8, 10/8, 10/15, 11/20, 11/23, 11/24, 11/25, and 12/1. Furlough plans may be altered after the beginning of the semester as a result of administrative actions or other emergencies, thus subsequent revisions to this syllabus may occur.

The CSU faculty agreed to take furlough days in order to preserve jobs for as many CSU employees as possible, and to serve as many students as possible, in the current budget crisis. The agreement that governs faculty furloughs acknowledges that "cuts of this magnitude will naturally have consequences for the quality of education that we can provide." Within the furlough context, I will make every effort to support your educational experience at CSUSM. Visit CSUSM Budget Central [<http://www.csusm.edu/budgetcentral/>] to learn about the state budget crisis and how it impacts your educational opportunities. To avoid the continued loss of higher education availability in California, exercise your right to voice an opinion. Contact information for state legislators and the governor are provided at Budget Central.

Tentative Course Schedule: Fall 2009

DATE	Session and Topics	Reading & Assignments
9/1/09	1. Building a mathematics learning community 2. Developing understanding in mathematics What does “understanding” mean in mathematics? Problem solving in the mathematics classroom.	
9/8/09	3. Lesson Design How do we make decisions about what to teach and how we teach it? How do we sequence the learning activities so that students can learn the intended themes? 4. Assessment How do we know whether or not students achieve learning objectives? What are the purposes of different types of assessment strategies? What do we respond when students do not learn?	Van de Walle et al. ch 4, 5, 6 Reflection 1 due
9/15/09	5. Introduction to Cognitively Guided Instruction (CGI) What are some types and structures of math problems? How do students solve problems? How do they develop number sense? How do we help children develop number sense? <i>Math topics: Number concepts</i> 6. Using models for mathematics teaching & learning How do we provide opportunities for hands-on explorations in learning mathematics? How manipulatives can help or fail to help children construct math ideas? <i>Math topics: Number concepts</i> Lesson design workshop (30 minutes)	Van de Walle et al. ch 8, 9, 10 Number concepts interview due* <i>Mathematics Learning Center Activities-Group 1 presentation**</i> Reflection 2 due
9/22/09	7. (con't) Using models for mathematics teaching & learning <i>Math topics: Number concepts and place value</i> Reflection 3 activity 8. (con't) Using models for mathematics teaching & learning Making sense of operations on whole numbers <i>Math topics: Addition, subtraction, multiplication, & division</i>	Van de Walle et al. ch 11, 12 Add/sub interview due* Mult/div interview due* <i>Mathematics Learning Center Activities-Group 2 presentation**</i> <i>Mathematics Learning Center Activities-Group 3 presentation**</i>
9/29/09	9. Making connections among math concepts Why are fractions, decimals, & percents different representations of the same quantity? What are some models for fractions? Reflection 4 activity 10. Making sense of operations on fractions Do we need common denominators in order to add or subtract fractions? Why do we invert and multiply?	Van de Walle et al. ch 15, 16, 17 Fractions interview due* <i>Mathematics Learning Center Activities-Group 5 presentation**</i>
10/6/09	11. Project-based teaching & learning How do open-ended math tasks allow students to make connections among math concepts? <i>Math topics: Measurement & geometry</i> 12. The meaning of the equal sign: Pathway to algebra What are children’s understanding and misunderstanding of the equal sign? How can we improve children’s understanding of the equal sign?	Van de Walle et al. ch 19, 20 Measurement/Geo interview due* Equal sign survey report due* <i>Mathematics Learning Center Activities-Group 6 presentation**</i>
10/13/09	13. Relational understanding of equality How do children develop understanding of equality? How do we promote a relational understanding of equality? 14. Lesson plan presentations I	Van de Walle et al. ch 14 Algebra interview due* Reflection 5 due Lesson plan due
10/20/09	15. Lesson plan presentations II 16. Conclusion What does it mean to do mathematics? What does a balanced curriculum entail? What makes a “good” mathematics teacher?	Van de Walle et al. ch 1, 2, 3 Reflection 6 due

* You just need to choose **two** of these six topics for student interviews. The due dates vary. If you choose to do an interview on addition/subtraction, then your paper is due on 9/22. If you want to do an interview on algebra, then your paper is due on 10/13.

** Presentation of *Mathematics Learning Center Activities*. After the presentation, you should submit this assignment within a week. For example, if you present an activity on number concepts on 9/22, the description (including some teaching tips) is due on 9/29.