California State University SAN MARCOS | School of Education

333 South Twin Oaks Valley Road San Marcos, California 92096-0001
Tel: 760.750.4300 Fax: 760.750.3160 www.csusm.edu/education

EDMS 543
Elementary Mathematics Education
CRN #45813
Mondays
8:30 am – 3:00 pm
Bonsall Elementary School | 31555 Old River Rd. | Bonsall, CA 92003
Fall 2013

Conceptual Framework Theme: Engaging diverse communities through leading and learning for social justice.

Professor:	Rong-Ji Chen Ph. D.
Phone:	760.750.8509
E-Mail:	rchen@csusm.edu
Office:	UH 406
Hours:	By Appointment or before and after class

School of Education Mission & Vision Statement

(Adopted by SOE Governance Community, January 2013)

Vision
To serve the educational needs of local, regional, and global communities, the School of Education advances innovative practice and leadership by generating, embracing, and promoting equitable and creative solutions.

Mission
The mission of the School of Education community is to collaboratively transform education. We:

- Create community through partnerships
- Promote and foster social justice and educational equity
- Advance innovative, student-centered practices
- Inspire reflective teaching and learning
- Conduct purposeful research
- Serve the School, College, University, and Community

Basic Tenets of our Conceptual Framework

- Student centered education
- Research and theory specific to the program field inform practice
- Connections and links between coursework and application
- Strong engagement between faculty and candidates
- Co-teaching clinical practice
- Culturally responsive pedagogy and socially just outcomes

COURSE DESCRIPTION

Focuses on curriculum development, methods, techniques, materials, planning, organization, and assessment in various elementary school curricula, and curriculum integration in mathematics. Methods of cross—cultural language and academic development will be integrated into the course. *Requires participation/observation in the public school.*

Course Prerequisites:
Admission to the Multiple Subject Credential Program

Course Objectives:
Learning to teach mathematics well is challenging and, therefore, this course is but one stage in your process of becoming a mathematics teacher. We are expected to: (a) increase our skills at listening to students and asking questions, (b) develop an understanding of children's content specific thinking, (c) 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, (d) deepen our understanding of the mathematics taught at the elementary school level, including such topics as place value, base systems, number theory, fractions, proportions, statistics, and algebra, (e) develop an understanding of the current issues and best practices in mathematics education, (f) develop a familiarity with the NCTM standards and Common Core State Standards, (g) understand the nature, purposes, and application of mathematics assessment and its relationship with curriculum, teaching, and learning, and (h) learn to teach content specific concepts using effective and appropriate strategies, including the educational use of technology.

Required Texts

- Van de Walle, J. A., Karp, K. M., & Bay-Williams, J. M. (2013). Elementary and middle school mathematics: Teaching developmentally (8th ed.). Boston: Allyn & Bacon.
- California Department of Education (2010). Common core state standards for mathematics. Sacramento, CA: Author. http://www.cde.ca.gov/ci/cc/
- 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
- Several other readings are required and will be available for download.

Recommended Texts

- Burns, M. (2007). About teaching mathematics: A K-8 resource (3rd Ed.). Sausalito, CA: Math Solutions Publications.
- Camii, C., & Housman, L. B. (1999). Young children reinvent arithmetic: Implications of Piaget's theory (2nd Ed.). New York: Teachers College Press.
- 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.
- Empson, S. B., & Levi, L. (2011). Extending children's mathematics: Fractions and decimals. Portsmouth, NH: Heinemann.
- Lampert, M. (2001). Teaching problems and the problems of teaching. New Haven, CT: Yale University Press.
- Small, M. (2012). Good questions: Great ways to differentiate mathematics instruction (2nd Ed.). New York: Teachers College Press.
- NCTM's professional journal: Teaching Children Mathematics, see http://www.nctm.org/publications/toc.aspx?jrnl=tcm

Authorization to Teach English Learners

This 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)

STUDENT LEARNING OUTCOMES

Teacher Performance Expectation (TPE) Competencies

The course objectives, assignments, and assessments have been aligned with the CTC standards for 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. Primary emphases:

- TPE 1a-Subject Specific Pedagogical Skills for MS Teaching (Mathematics)
- TPE 2-Monitoring Student Learning During Instruction

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, SoE 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 SoE website: http://www.csusm.edu/education/CalTPA/ProgramMaterialsTPA.html

Assessment of Professional Dispositions

Assessing a candidate's dispositions within a professional preparation program is recognition that teaching and working with learners of all ages requires not only specific content knowledge and pedagogical skills, but positive attitudes about multiple dimensions of the profession. The School of Education has identified six dispositions – social justice and equity, collaboration, critical thinking, professional ethics, reflective teaching and learning, and life-long learning—and developed an assessment rubric. For each dispositional element, there are three levels of performance - *unacceptable*, *initial target*, and *advanced target*. The description and rubric for the three levels of performance offer measurable behaviors and examples.

The assessment is designed to provide candidates with ongoing feedback for their growth in professional dispositions and includes a self-assessment by the candidate. The dispositions and rubric are presented, explained and assessed in one or more designated courses in each program as well as in clinical practice. Based upon assessment feedback candidates will compose a reflection that becomes part of the candidate's Teaching Performance Expectation portfolio. Candidates are expected to meet the level of *initial target* during the program.

School of Education Attendance Policy

Due to the dynamic and interactive nature of courses in the School of Education, all students are expected to attend all classes and participate actively. 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).*

This course: Teacher education is a professional preparation program. Therefore, candidates missing more than one class session cannot earn an A or A-. Candidates missing more than two class sessions cannot earn a B or B+. Candidates missing more than three classes cannot earn a C+. Arriving late or leaving early by more than 20 minutes counts as an absence. Notifying the instructor does not constitute an excuse. All assignments must be turned in on due date even in case of an absence.

Students with Disabilities Requiring Reasonable Accommodations

Students with disabilities who require reasonable accommodations must be approved for services by providing appropriate and recent documentation to the Office of Disable Student Services (DSS). This office is located in Craven Hall 4300, 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.

All University Writing Requirement

The CSUSM writing requirement of 2500 words is met through the completion of course assignments. Therefore, all writing will be looked at for content, organization, grammar, spelling, and format. For this class please use APA Manual, 6th edition (see a guide at http://owl.english.purdue.edu/owl/section/2/10/).

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.

Computer/Cell Phone Use during Class Sessions:

You are encouraged to use a laptop computer or tablet in class when working on class assignments. However, you will need to save checking email or other personal computer use for time outside of class. Please refrain from texting in class. Most students find it disruptive when they are focusing on class activities or listening to presentations. 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.

Use of Technology:

Students are expected to demonstrate competency in the use of various forms of technology (i.e. word processing, electronic mail, Moodle, use of the Internet, and/or multimedia presentations). Specific requirements for course assignments with regard to technology are at the discretion of the instructor. Keep a digital copy of all assignments for use in your teaching portfolio. All assignments will be submitted online, and some will be submitted in hard copy as well. Details will be given in class.

Electronic Communication Protocol:

Electronic correspondence is a part of your professional interactions. If you need to contact the instructor, e-mail is often the easiest way to do so. It is my intention to respond to all received e- mails in a timely manner. Please be reminded that e-mail and on-line discussions are a very specific form of communication, with their own nuances and etiquette. For instance, electronic messages sent in all upper case (or lower case) letters, major typos, or slang, often communicate more than the sender originally intended. With that said, please be mindful of all e-mail and on- line discussion messages you send to your colleagues, to faculty members in the School of Education, or to persons within the greater educational community. All electronic messages should be crafted with professionalism and care.

Things to consider:

- Would I say in person what this electronic message specifically says?
- How could this message be misconstrued?
- Does this message represent my highest self?
- Am I sending this electronic message to avoid a face-to-face conversation?
  In addition, if there is ever a concern with an electronic message sent to you, please talk with the author in person in order to correct any confusion.

Course Requirements

Teaching and learning require engaged and reflective participants. It is essential that you prepare carefully for class, be ready to discuss readings and assignments thoughtfully, and actively participate in all class activities. Here is a list of the assignments and requirements, followed by descriptions of each of them:

Assignment	Points	Due Date
Mathematics autobiography	-	9/9
Reflections	15	ongoing
Lesson design	15	9/23
Mathematics learning activity	20	varies
Clinical student interview	10	9/30
Online modules	10	10/7 & 10/11
Assessment of problem solving	15	10/21
Professional dispositions/participation	15	ongoing

Mathematics Autobiography—This assignment will not be graded but will count as part of your participation grade. This assignment has three components:

(a) Make a drawing of what comes to mind when you think about mathematics (i.e., what mathematics is to you?). Provide a brief explanation of your drawing.
(b) Define a mathematician. Write a one-paragraph definition. USE YOUR OWN WORDS AND DEFINITION. Do not use a dictionary or Wikipedia.
(c) Write a 2-page reflection (double-spaced) on your experience as a mathematics student (you can start at Kindergarten if you wish!). Position yourself concerning how "good" you are in math. Discuss your feelings about math and your perception of yourself as a math learner. Did you feel you were an active participant in your math classes, or you felt that you were mostly an outsider? Did you see personal meanings/purposes in math or just to get a grade and move on?

Reflections—Each week you will reflect on the readings, observations, or our class activities. You will submit a reflection *prior to class*. The focus will be on how you make sense of the information rather than a summary. The purpose of the reflections is to prepare you for class discussion and to reflect on your own experiences, beliefs, and theories about mathematics education. There will be time for discussion of the readings so it is imperative that you do the readings each week. The way in which you are asked to reflect may change week to week.

Lesson Design—You will work with peers and collaboratively design a problem-based math lesson. The lesson needs to be aligned with Van de Walle's "teaching through problem solving" framework and require a higher-level cognitive demand. You are encouraged but not required to implement the lesson in your practicum/clinical teaching classroom.

Mathematics Learning Activity (MLA). The purpose of this assignment is to provide you with opportunities to (1) experience teaching a math activity in a small group setting, (2) reflect on student learning, (3) set up learning centers in a classroom and rotate students through various activities.

Part I. Group work (10 points)
This portion of the assignment will be completed with a small group of 4-5 members. Each group will select a math topic in K-8 curriculum and be responsible for presenting activities from the correspondent chapters in the textbook. Choose the activities that help the class understand the big ideas in the chapters and that demonstrate various instructional strategies. Your goal is to engage your peer teacher candidates in advancing their understanding of the key ideas, frameworks, effective teaching strategies, and so on in the chapters. Each member of your group will select an activity from the assigned chapters and then teach the activity in our class (see course schedule) in a learning center type format. If you do not like any activity in the chapters, you are welcome to design your own activity. In either case, your activity should be planned and/or adapted to show **evidence of higher-order thinking** (no bingo games!). Each individual activity should take about 7-10 minutes. Therefore, if the activity in the text is too short or too long, you need to adapt it to fit the time frame.

For example, if your group has 5 members, there will be 5 math activities. Your group will set up 5 learning centers. Each of you will do your activity at a learning center. The rest of the class will form into 5 groups, and they will rotate through the 5 learning centers/activities. It means that you have the opportunity to do your activity 5 times, and chances are you will modify the activity to meet the participants' needs.

Part II. Individual work (10 points)
You will implement and videotape your MLA to the students (may range from a small group to entire class) in your practicum/clinical practice class. Be prepared to discuss modifications made to your activity based on your "experience" teaching it in the 543 class. You will review the video and submit a reflection on the implementation of your MLA and student learning. You also need to submit the video.

You may be asked to share your MLA implementation by means of an oral presentation, in which you will show the video, discuss student learning, and answer questions from the audience.

Online Modules—There will be a few online sessions. You need to complete a learning module for each online session. The modules will be posted on Cougar Courses.

Assessment of Problem Solving—This assignment is intended for group work. Your group will analyze and sort students' solution strategies to a math problem based on the effectiveness of strategies or levels of understanding.

- Stage 1: Collecting students' problem solving strategies. You will pose a math problem to a whole class of students and collect their solution strategies. Or you can obtain students' problem solving strategies from your cooperating teacher.
- Stage 2: Interpreting students' understanding and problem solving skills. You will analyze and sort students' solution strategies into 3 to 4 categories/levels of understanding and effectiveness of strategies. Choose a student from each category/level whose work represents that category/level.
- Stage 3: Reporting. Your group will write and submit a report containing: (1) the problem; (2) an overall summary of student performance; (3) categories or levels of student work; (4) which 3 or 4 students or groups will you choose to represent the categories/levels; (5) why do you choose these students? (6) implications for instruction; and (7) a concluding remark on the assessment process: what worked and what could be done differently? The report should not exceed 3 pages. Attach copies/scans of the chosen students' work.

Clinical Student Interview – The purpose is to gain insight into students' mathematical thinking and understanding, to learn how to effectively pose questions and interpret the meaning of students' responses, and to provide you with an opportunity to interact with students. You will conduct a clinical interview with a student to assess his or her understanding of mathematics and problem solving skills. Sample interview questions are provided, but you are encouraged to use your own invention with instructor approval. You will pose mathematical problems/tasks for the student to solve and will ask the student to explain his or her thinking so you may gain insight into his or her mathematical understanding and strategies. You need to submit a 2-page reflective report. Please also include the student's written work (if available). You can 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. See the Student Interview Guidelines and a sample interview report on Cougar Courses.

Professional Dispositions & Participation—You are expected to actively participate in in-class and online 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).

Assignment Policy

All assignments, requirements, due dates, and scoring rubrics will be available through Cougar Courses. You are responsible to track your grades and progress in the course. In order to successfully complete this course, all assignments must be completed at an acceptable level noted on assignment directions and rubrics. Each written assignment is expected to have a clear organizational presentation and be free of grammar, punctuation, or spelling errors. There will be a reduction in points for the above-mentioned errors.

All assignments are due by 11pm on the due date. Late assignment policy: -1 one day late, -2 two days late, -3 three days late, and so on. After a week, no assignments will be accepted. If extraordinary circumstances occur, please contact the instructor.

Grading Standards

Final grades are calculated on the standard of:

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		

Failure to complete this course with a grade of C+ or higher will prohibit a teacher candidate from continuing the teaching credential program.

Tentative Course Schedule

The dynamic nature of teaching and learning makes it hard to establish a set schedule. Please note that modifications will likely to occur at the discretion of the instructor.

Date	Session, Topics, & Essential Questions	Reading & Assignments
8/26	1. Building a math learning community - Course overview - Characteristics of an effective math classroom 2. Challenging students with rich math tasks - Different levels of cognitive demand of math tasks - MLA & learning centers	Course syllabus Van de Walle et al. ch 2
9/9	3. Unpacking math standards - Common Core State Standards **Planning time for math standards activity—bring your laptop or tablet.** 4. Lesson design: Teaching through problem solving (1) - The art of listening to students and asking good questions - Designing and selecting math tasks for higher-order thinking	CA Common Core State Standards Van de Walle et al. ch 1, 3 **Reflection 1** **Math autobiography**
9/16	5. Teaching through problem solving (2) - Designing problem-based lessons **Lesson plan workshop: Bring ideas & materials** **Math standards presentations** 6. Assessment of students' thinking in mathematics - Assessment strategies and their purposes - Rubrics and scoring	Van de Walle et al. ch 4, 5 **Reflection 2** **Math standards PPT**
9/23	7. Introduction to Cognitively Guided Instruction (CGI) What are some types and structures of math problems? How do students solve problems? How do we help children develop number sense? **MLA group 1 presentation (ch 8, 9)** 8. Students as young mathematicians - Developing number sense - Affective factors in math learning **MLA group 2 presentation (ch 10, 11)**	Van de Walle et al. ch 8, 9, 10, 11 **Reflection 3** **Lesson design** **MLA (if ready)**
9/30	9. Using models for teaching & learning whole numbers How do we provide opportunities for hands-on explorations of mathematics? How can manipulatives help or fail to help children construct math ideas? **MLA group 3 presentation (ch 12, 13, 19, 20)** 10. Lesson & MLA presentations and discussion How can we maintain the intended cognitive level of a math task? How do we collect evidence of learning as a means for in-depth reflection on the effectiveness of instructional strategies?	Van de Walle et al. ch. 12, 13 **Reflection 4** **Student interview** **MLA (if ready)**
10/7	11. Online session: Differentiation Complete the *differentiation module* on Cougar Courses by October 7th. 12. Online session Complete the *fraction module* on Cougar Courses by October 11th.	Van de Walle et al. ch. 6, 15, 16

10/14	13. Using models for teaching & learning fractions What are some models for fractions? How do we help students understand operations on fractions? What are the strengths and limitations of manipulatives for fraction concepts? **Lesson design showcase** 14. Socio-political issues in math education How does traditional math education preserve elite groups while denying other children access to powerful math? How is math education related to civil right and social justice?	Article: Gutstein (2005) Article: Peterson (2012) **Reflection 5** **MLA (if ready)**
10/21	15. Teaching for conceptual understanding: the case of algebraic thinking Children's understanding and misunderstanding of the equal sign. How can we improve children's relational understanding? **MLA group 4 presentation (ch 14, 15, 16)** 16. Summary	Van de Walle et al. ch 14 **Reflection 6** **Assessment of problem solving** **MLA**