California State University San Marcos College of Education Spring 2004

EDMS 543 – Mathematics Education in Elementary Schools (3 units)

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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 ongoing service. Our practices demonstrate a commitment to student-centered education, diversity, collaboration, professionalism, and shared governance.

REQUIRED MATERIALS

- California Department of Education (2000). *Mathematics content standards for California public schools, kindergarten through grade twelve*. Sacramento, CA: Author. This document can be found on the WWW at: <u>http://www.cde.ca.gov/standards/</u> The Web site contains both HTML versions and a downloadable PDF file. (I <u>highly</u> encourage students to purchase this publication). There are copies in the library for check out.
- National Council of Teachers of Mathematics (2000). *Principles and standards for school mathematics*. Reston, VA: Author. This document can be found at: <u>http://standards.nctm.org/</u>
- Star Test Blueprints for Standards Items (2-7) http://www.cde.ca.gov/statetests/star/resources/blueprints.html.
- Van de Walle, John A. (2004). *Elementary and middle school mathematics: Teaching developmentally* (5th Edition). Boston: Pearson Education, Inc. The text has a companion Web site at: <u>http://wps.ablongman.com/ab_vandewalle_math_5</u>.
- Choate, J. S. (2000). *Successful inclusive teaching: Proven ways to detect and correct special needs*. Boston: Allyn and Bacon

COURSE DESCRIPTION

Learning to teach mathematics well is difficult and, therefore, you must expect that this course will only begin your education in learning how to teach mathematics. This course is but one stage in what is hoped will be a continuing evolution of you as a mathematics teacher. The focus of this course will be on (1) developing an understanding of the current practices in mathematics, (2) learning to teach content specific concepts using effective and appropriate strategies, and (3) practicing how to teach for mathematical understanding. Enfolded into this course will be curriculum development, developing an understanding of children's content specific thinking, creating a classroom environment that promotes the investigation and growth of mathematical ideas, and developing strategies to ensure the success of all students in multi-cultural settings.

Standards Alignment:

The course objectives, assignments, and assessments have been aligned with the CTC standards for Multiple Subjects Credential. The following standards are a primary emphasis in this course:

- Standard 3: Relationship between Theory and Practice
- Standard 4: Pedagogical Thought and Reflective Practice
- Standard 5: Equity, Diversity and Access to the Core Curriculum for All Children
- Standard 8A(a): Pedagogical Preparation for Subject-Specific Content Instruction by MS Candidates (Mathematics)

Teacher Performance Expectation (TPE) Competencies:

This course is designed to help teachers seeking the Multiple Subjects Credential to develop the skills, knowledge, and attitudes necessary to assist schools and district in implementing an effective program 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. The following TPE's are addressed in this course:

Primary Emphasis:

• TPE 1a-Subject Specific Pedagogical Skills for MS Teaching (Mathematics)

Secondary Emphases:

- TPE 2-Monitoring Student Learning During Instruction
- TPE 3-Interpretation and Use of Assessments
- TPE 4-Making Content Accessible
- TPE 5-Student Engagement
- TPE 6a-Developmentally Appropriate Practices in Grades K-3
- TPE 6b-Developmentally Appropriate Practices in Grades 4-8
- TPE 6d- Developmentally Appropriate Teaching Practices for Special Education: Teaching the Special Education Population in the General Education Environment
- TPE 7-Teaching English Learners
- TPE 8-Learning About Students
- TPE 9-Instructional Planning
- TPE 10-Instructional Time
- TPE 11-Social Environment
- TPE 13-Professional Growth
- TPE 14-Educational Technology in Teaching and Learning

ASSIGNMENTS

Detailed assignment sheets (course packet) will be provided electronically for every assignment below. The course calendar/topics schedule is attached to this syllabus.

Reading Reflections

(20%) - Each week students will write a "meaningful" reflection on the material assigned to be read for that week. These reflections should be <u>one page</u> in length (use an "11" font, line spacing of 1.5, with **only** your name and class session number as a heading), and should clearly articulate your thoughts <u>on the assigned readings</u> and how you might **specifically apply** what you learned from the articles as a teacher in the classroom. Please do not repeat verbatim from the readings.

Student Interviews (Critical Assessment Task – CATs)

(20%) - You and one of your classmates will conduct a series of three different student interviews based on questions provided in class. 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 and interpret the meaning of students' answers, and to provide you with an opportunity to interact with students.

Mathematical Resources & Lesson (Critical Assessment Task - CATs)

(35%) – Working in small groups, your team will first compile resources on a predetermined mathematical topic (20%) and then design a lesson that you will present in an elementary class (15%). The purpose of this activity is to help you learn how to design effective mathematical activities, to provide you with an opportunity to begin compiling mathematical resources, and to provide an opportunity for you to practice teaching mathematics.

Curriculum Assignment (Critical Assessment Task – CATs)

(20%) – Students will review the mathematics curriculum currently being used in your classroom (e.g., a textbook) at one grade level and write a short paper that investigates the curriculum alignment with the CA Content Standards and current high stakes assessments. Students will also provide their general thoughts and concerns related to the curriculum (e.g., how the curriculum might need to be altered to make strong connections between mathematical concepts and procedures).

Active Participation and Collaboration (5%) – Defined as actively engaging in all class discussions and activities, students will be evaluated daily. A <u>positive attitude</u> is an important component for establishing the definition for active participation and collaboration. From 0-5 points can be earned in this category depending on the student's degree of active participation and collaboration.

A COURSE PACKET WITH ASSIGNMENT DETAILS AND SCORING RUBRICS WILL BE PROVIDED ELECTRONICALLY TO EACH STUDENT.

INFUSED COMPETENCIES

CLAD

In 1992, the College of Education voted to infuse Cross-cultural, Language and Academic Development (CLAD) competencies across the curriculum. The CLAD competencies are attached to the syllabus and the competencies covered in this course are highlighted.

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

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.

Technology

This course infuses technology competencies to prepare our candidates to use technologies, emphasizing their use in both teaching practice and student learning.

ATTENDANCE POLICY

The attendance policy of the College of Education: Due to the dynamic and interactive nature of courses in the COE, 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. If you miss two class sessions or are late (or leave early) more than three sessions, you cannot receive a grade of "A". If you miss three class sessions, your highest possible grade is a "C+". Should you have extenuating circumstances, contact the instructor as soon as possible. Please discuss with me any extenuating circumstances that will cause you to miss class <u>prior</u> to your absence. Attendance will be taken at each class session. Furthermore, grades on assignments turned in late will be lowered unless <u>prior arrangements</u> have been made with the instructor.

PLAGIARISM AND CHEATING

Please be sure to read and understand the university policy on plagiarism and cheating, as it will be strictly enforced. Academic dishonestly will not be tolerated and will result in a failing grade for this course and will be reported to the University.

Students with Disabilities Requiring Reasonable Accommodations

Students are approved for services through the Disabled Student Services Office (DSS). This office is located in Craven Hall 5205 and can be contacted by phone (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.

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

Remember! You are required to maintain a B average (3.0 GPA) in your teacher education courses to receive a teaching credential in the State of California.

TEST 1: LANGUAGE	TEST 2: METHODOLOGY	TEST 3:
STRUCTURE	OF BILINGUAL, ENGLISH	CULTURE
AND	LANGUAGE DEVELOPMENT,	AND
FIRST- AND SECOND-	AND	CULTURAL DIVERSITY
LANGUAGE DEVELOPMENT	CONTENT INSTRUCTION	
I. Language Structure and Use:	I. Theories and Methods of	I. The Nature of Culture
Universals and Differences	Bilingual Education	
(including the structure of		
English)		
A. The sound systems of language (phonology) *	A. Foundations	A. Definitions of culture
B. Word formation (morphology)	B. Organizational models: What works for whom?	B. Perceptions of culture
C. Syntax *	C. Instructional strategies *	C. Intragroup differences (e.g.,
		ethnicity, race, generations,
D. Word meaning (semantics) *	II. Theories and Methods for	and micro-cultures) D. Physical geography and its
D. Word meaning (semantics)	Instruction In and Through English	effects on culture
	A. Teacher delivery for <u>both</u>	
E. Language in context *	English language	E. Cultural congruence
	development and content	
	instruction *	II. Manifactationa of Outburge
F. Written discourse *	B. Approaches with a focus on English language	II. Manifestations of Culture: Learning About Students
	development *	Learning About Students
G. Oral discourse *	C. Approaches with a focus on	A. What teachers should learn
	content area instruction	about their students *
	(specially designed	
	academic instruction delivered in English) *	
H. Nonverbal communication *	D . Working with	B. How teachers can learn
	paraprofessionals *	about their students *
II. Theories and Factors in	III. Language and Content	C. How teachers can use what
First- and Second-Language	Area Assessment	they learn about their
Development		students (culturally
A. Historical and current theories		responsive pedagogy)*
and models of language	A. Purpose	III. Cultural Contact
analysis that have implications		
for second-language		
development and pedagogy		
B. Psychological factors affecting first- and second-	B. Methods *	A. Concepts of cultural contact
language development		
C. Socio-cultural factors	C. State mandates	B. Stages of individual cultural
affecting first- and second-		contact
language development		
D. Pedagogical factors affecting	D. Limitations of assessment	C. The dynamics of prejudice
first- and second-language development *		
E. Political factors affecting first-	E. Technical concepts *	D. Strategies for conflict
and second-language		resolution
development		
I		

Curriculum Review Assignment EDMS 543

		Nearly		
	Developing	Meets	Meets	Exceeds
TPE 1, 1a	Candidate's	Candidate's	Candidate's	Candidate's
Subject Specific	analysis of the	analysis of the	analysis of the	analysis of the
Pedagogical skills	curriculum will	curriculum will	curriculum will	curriculum will
for MS Teaching	demonstrate little to	demonstrate some	demonstrate	demonstrate
Assignment	no understanding of	understanding of	considerable	exceptional
(Teaching	how to teach the	how to teach the	understanding of	understanding of
Mathematics in a	state adopted	state adopted	how to teach the	how to teach the
MS Assignment)	academic content	academic content	state adopted	state adopted
	standard in	standard in	academic content	academic content
	mathematics.	mathematics.	standard in	standard in
			mathematics.	mathematics.
TPE 4	Candidate's	Candidate's	Candidate's	Candidate's
Making Content	analysis of the	analysis of the	analysis of the	analysis of the
Accessible	curriculum will	curriculum will	curriculum will	curriculum will
	demonstrate little to	demonstrate some	demonstrate	demonstrate
	no understanding in	understanding in	considerable	exceptional
	the use of	the use of	understanding in	understanding in
	pedagogical	pedagogical	the use of	the use of
	strategies that will	strategies that will	pedagogical	pedagogical
	provide all students	provide all students	strategies that will	strategies that will
	access to the	access to the	provide all students	provide all students
	mathematics	mathematics	access to the	access to the
	curriculum.	curriculum	mathematics	mathematics
			curriculum	curriculum
TPE 6, 6a, 6b	Candidate's	Candidate's	Candidate's	Candidates's
Developmentally	analysis of the	analysis of the	analysis of the	analysis of the
Appropriate	curriculum will	curriculum will	curriculum will	curriculum will
Teaching Practices	demonstrate little to	demonstrate some	demonstrate	demonstrate
in Grades K-3 & 4-	no understanding in	understanding in	considerable	exceptional
8	the use of	the use of	understanding in	understanding in
	developmentally	developmentally	the use of	the use of
	appropriate	appropriate	developmentally	developmentally
	teaching practices.	teaching practices	appropriate	appropriate
			teaching practices	teaching practices

Secondary TPE's for this Assignment → TPE 9 – Instructional Planning → TPE 10 – Instructional Time

Lesson Presentation Assignment EDMS 543

		Nearly		
	Developing	Meets	Meets	Exceeds
TPE 1, 1a	Candidates' lesson	Candidates' lesson	Candidates' lesson	Candidates' lesson
Subject Specific	plan and	plan and	plan and	plan and
Pedagogical skills	presentation	presentation	presentation	presentation
for MS Teaching	demonstrates little	demonstrates some	demonstrates	demonstrates
Assignment	to no	understanding of	considerable	exceptional
(Teaching	understanding of	how to teach the	understanding of	understanding of
Mathematics in a	how to teach the	state adopted	how to teach the	how to teach the
Multiple Subject	state adopted	academic content	state adopted	state adopted
Assignment)	academic content	standard in	academic content	academic content
	standard in	mathematics	standard in	standard in
	mathematics		mathematics	mathematics
TPE 4	Candidates' lesson	Candidates' lesson	Candidates' lesson	Candidates' lesson
Making Content	plan and	plan and	plan and	plan and
Accessible	presentation will	presentation will	presentation will	presentation will
	demonstrate little	demonstrate some	demonstrate	demonstrate
	to no	understanding in	considerable	exceptional
	understanding in	the use of	understanding in	understanding in
	the use of	pedagogical	the use of	the use of
	pedagogical	strategies that will	pedagogical	pedagogical
	strategies that will	provide all students	strategies that will	strategies that will
	provide all students	access to the	provide all students	provide all students
	access to the	mathematics	access to the	access to the
	mathematics	curriculum	mathematics	mathematics
	curriculum		curriculum	curriculum
TPE 6, 6a, 6b	Candidates' lesson	Candidates' lesson	Candidates' lesson	Candidates' lesson
Developmentally	plan and	plan and	plan and	plan and
Appropriate	presentation will	presentation will	presentation will	presentation will
Teaching	demonstrate little	demonstrate some	demonstrate	demonstrate
Practices – Grades	to no	understanding in	considerable	exceptional
K-3 & 4-8	understanding in	the use of	understanding in	understanding in
	the use of	developmentally	the use of	the use of
	developmentally	appropriate	developmentally	developmentally
	appropriate	teaching practices.	appropriate	appropriate
	teaching practices.		teaching practices.	teaching practices.

- Secondary TPE's for this Assignment
 TPE 2 Monitoring Student Learning During Instruction
 TPE 5 Student Engagement
 TPE 9 Instructional Planning
 TPE 10 Instructional Time

 - ➢ TPE 11 − Social Environment

Lesson Resources Assignment EDMS 543

		Nearly		
	Developing	Meets	Meets	Exceeds
TPE 4	Candidates'	Candidates'	Candidates'	Candidates'
Making Content	resources and	resources and	resources and	resources and
Accessible	descriptions will	descriptions will	descriptions will	descriptions will
	demonstrate little	demonstrate some	demonstrate	demonstrate
	to no	understanding of	considerable	exceptional
	understanding of	how instructional	understanding of	understanding of
	how instructional	resources can help	how instructional	how instructional
	resources can help	provide all	resources can help	resources can help
	provide all	students with	provide all	provide all
	students with	access to a	students with	students with
	access to a	balanced and	access to a	access to a
	balanced and	comprehensive	balanced and	balanced and
	comprehensive	curriculum.	comprehensive	comprehensive
	curriculum.		curriculum.	curriculum.

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Student Interview Assignment EDMS 543

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Secondary TPE's for this Assignment

- ➤ TPE 5 Student Engagement
- > TPE 6, 6a, 6b Developmentally Appropriate Practices in Grades K-3 & Grades 4-8.
- TPE 8 Learning about Students
- TPE 9 Instructional Planning

DATE	EDMS 543 COURSE TOPICS (TF)	Van De Walle text chapters
01/20/04	Course Introduction	1- Teaching Mathematics in
	Why do we do mathematics? (Big picture)	the Context of the Reform
	Conceptual vs. procedural knowledge	Movement
	Characteristics of Effective Classrooms: Overview of Instructional Practices	2 - Exploring What It Means
		to do Mathematics
01/23/04	Developing understanding—How do kids learn?	3 -Developing Understanding
	Teaching through problem solving	in Mathematics
	Discussion of Cognitively Guided Instruction	4 -Teaching Through
		Problem Solving
01/27/04	-Interviews	5 -Building Assessment into
	-Assessment – Connecting instruction to assessment	Instruction
	-How kids learn through problem solving development	6 - Planning in the Problem-
		Based Classroom
01/30/04	Mathematics Content Standards for California Public Schools	This document is available on:
	Group presentations of assigned standards	http://www.cde.ca.gov/standards/
	or oup presentations of assigned standard as	
	CA Mathematics Standards Star Test Blueprint	
02/03/04	Special Populations: Creating Inclusive Classrooms	7 - Teaching All Children
	Multiple Representations and meeting the needs of all students	Mathematics
	Article summary/critique on Math and Special Populations due	-Article on math & special needs
02/06/04	Number Sense I: PRACTICE INTERVIEW DUE	9 - Developing Early Number
52,00,01	What it means and how we can help children develop it.	Concepts and Number Sense
		<u>^</u>
02/10/04	Number Sense II:	10 -Developing Meanings for the
	Classification of word problems for addition, subtraction, multiplication, and	Operations
	division.	11 - Helping Children Master the
	How all children can construct efficient mental tools for fact mastery.	Basic Facts
02/13/04	Number Sense III:	12 - Whole-Number Place-Value
02/10/01	Developing understanding of place value	Development
	Place Value Interview due	
02/17/04	Number Sense IV:	13 - Strategies for Whole
02/17/01	Developing flexible methods of computation, mental strategies, and estimation.	Number Computation
	Building estimation skills	14 – Computational Estimation
	Add/Subtraction OR Multiplication/Division classroom presentation	with Whole Numbers
	Addition/Subtraction OR Multiplication/Division interview due (turn in	
	only one interview)	
02/20/04	Fractions I :	15 - Developing Fraction
	Constructing understanding of fractions; fraction computation	Concepts
	Fraction classroom presentation #1 (grades K-4 lesson choice)	16 - Computation with Fractions
	Fraction interview due	
02/24/04	Fractions II:	17 – Decimal & Percent Concepts
02/2 ./ 0 .		and Decimal Computation
	Fraction classroom presentation #2 (grades 5-8 lesson choice)	18 – Developing Concepts of
		Ratio and Proportion
02/27/04	Measurement - Customary and metric system	19 - Developing Measurement
52,27,01	Measurement classroom presentation	Concepts
	Measurement interview due	
03/02/04	Geometry – Developing geometric reasoning and spatial sense	20 - Geometric Thinking and
00/02/04	Geometry classroom presentation	Geometric Concepts
	Geometry interview due	Geometrie Concepts
03/05/04		21 Exploring Concents of
03/03/04	Probability & Data Analysis – Developing meaningful experiences in gathering	21 - Exploring Concepts of
	and displaying statistical data.	Probability and Data
	Exploring concepts of chance, simple and independent events.	Analysis
	Probability & Data Analysis classroom presentation	
	Probability & Data Analysis interview due	
00/00/01		
03/09/04	Algebraic Reasoning and Function – Exploring patterns, variables, and	22 - Algebraic Reasoning
03/09/04	equations. Developing function concepts.	22 - Algebraic Reasoning 23 – Exploring Functions
	equations. Developing function concepts. Algebra classroom presentation	
03/09/04	equations. Developing function concepts. Algebra classroom presentation Wrap-up	
	equations. Developing function concepts. Algebra classroom presentation	

Technology – This competency will be infused throughout the course. Use this chapter as an	8 – Technology and School
ongoing reference.	Mathematics