CALIFORNIA STATE UNIVERSITY SAN MARCOS
COLLEGE OF EDUCATION
EDST 611 – ADVANCED METHODS IN SCIENCE TEACHING
Spring 2007
Meeting Time: Tuesday 4.00 – 9.45 p.m.
San Juan Capistrano Unified School District Offices

General Information:

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Office Hours: Before and After class
Other times are also available by appointment so please feel free to call or e-mail me to set up a convenient time to meet.

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 Textbooks:

Required Course Materials and Texts

1. Joyce, B., Weil, M. & Calhoun, E. (2004). *Models of Teaching.* Boston, MA: Allyn & Bacon. Available for online subscription at: http://www.safarix.com/0205464645
2. California Science Education Standards – Free from state Education Department website : http://www.cde.ca.gov/ci/sc/cf/index.asp

Other handouts will be distributed in class or through WebCT

Other Good Books:

Great Explorations in Math & Science (G.E.M.S.). Lawrence Hall of Science. http://www.lhs.berkeley.edu/GEMS/

Activities Integrating Math and Science. Aims Education Foundation. http://wwws.aimsedu.org/aimscatalog/default.tpl

These and many other hands-on science books are in bookstores, museums, zoos, even grocery stores!

COURSE DESCRIPTION

This course has a multidimensional purpose: it includes an overview of the major subjects in the Life Sciences, as well as the examination and practice of a variety of instructional models which enhance learning of science concepts and processes. Rationales for the use of each model will be included. Emphases will be placed on both science content and inquiry instruction. The practice and use of authentic assessments for effective science teaching will also be examined. The course focuses on developing an understanding of theory, methodology, and assessment of science in integrated and inclusive elementary and middle and high school classrooms. While this course provides new learning opportunities, it also offers you an opportunity to practice, apply and demonstrate the knowledge and skills acquired in your masters program.
Prerequisite: Enrollment in the Education Master's Program and/or hold credential.

Course Objectives

By completing this course the student will:

1) Learn and teach many of the major concepts in Life/Physical Science that are also appropriate to his or her grade level

2) Develop and evaluate assessment instruments that will give him or her information about student understanding by modeling/ using formative and summative assessments that include both authentic and traditional examples.

3) Practice teaching using effective (macro) and (micro) strategies that can be used in science.

4) Practice matching of standards to objectives to activities to assessments.

5) Develop a list of resources appropriate to select science concepts.

COURSE REQUIREMENTS

COE 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. 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.

For this class, each class session that you are absent from class drops your maximum final grade by one letter grade. If you are absent for one class session your highest possible score will be A-. If you are absent twice your highest possible score will be B+ etc. Late arrivals and early departures will affect your final grade as well. Absences do not change assignment due dates.

Writing
In keeping with the All-University Writing Requirement, all courses must have a writing component of at least 2,500 words (approximately 10 pages), which can be administered in a variety of ways.

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 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 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." In addition, all cases of academic dishonesty will be reported to the Dean of Students.

COURSE ASSIGNMENTS AND LEARNING OUTCOMES

1. Reading Accountability Journal Entries (RAJEs) 10%
2. Planning parts A-C (Unit plan and strategies) – 20%
3. Analyzing your Teaching via video editings -20%

4. Written Reflection responding to the listed questions – 10%
5. PowerPoint presentation at end of teaching cycle - 10%
6. Mini-lesson Presentation – 20%
7. Attendance and participation – 10%

Each student is responsible for ensuring that assignments are submitted correctly and on time. Late assignments will be penalized by a 10%-point reduction each day they are late. WebCT assignments not correctly posted do not count as submitted and will be subjected to the late assignment policy. You will not be assigned a course grade unless all the assignments are turned in.

CRITERIA FOR GRADING ASSIGNMENTS

A 90-100%: Outstanding work on assignment, excellent syntheses of information and experiences, great insight and application, and excellent writing.

B 80-89%: Completion of assignment in good form with good syntheses and application of information and experiences; writing is good.

C 70-79%: Completion of assignment, adequate effort, adequate synthesis of information, and application of information and experiences, writing is adequate.

D 60-69%: Incomplete assignment, inadequate effort and synthesis of information, writing is less than adequate.

Grades will be determined by points earned:

A = 93-100 C+ = 77-79
A– = 90-92 C = 73-76
B+ = 87-89 C- = 70-72
B = 83–86 D = 60-69
B- = 80-82 F = 0-59

ASSIGNMENT DESCRIPTIONS

1. Reading Accountability Journal Entries for Ch. 2-18 (individual). 100 points - Due at the start of each class session

The assigned readings provide an important foundation for your increasing understanding of how to effectively teach science. In order for one to participate in discussions, expectations are that the reading accountability journal entries will be completed prior to coming to class. The journal entries will not be collected. This is on the honor system but if it is evident that a student has not done the reading and the log, he or she will be deducted appropriate points. The following format is a possible suggestion of how this might be done:

- Short summary of the main ideas
- List some questions you would like to discuss with your group
- Make some connections with something that has happened in your teaching and/or learning experience.
- Find at least four interesting concepts or passages that are new or have special meaning to you and or recommendations.
- Create a visual of what your favorite part of the reading, what you learned and share it

2. Applying Teaching Strategies – 600 points

The major assignment of this course involves planning and teaching appropriate grade level science content using the teaching strategies that will be learned in the course. The sequence of activities for this assignment will follow a Planning-------→ Teaching-----→ Reflection professional development cycle model. This will be executed as follows:

Planning:

Develop a unit plan which includes the following:

1) A presentation/discovery of content appropriate to a science standards for that grade level
2) An application from the science standards of at least one hands- on investigation/activity that matches the standard (lab, discrepant event, field event, experiment, computer simulation or use of probe ware)
3) An application/demonstration of an assessment (formative and summative) that is authentic in nature to be used with the students.
4) An application /demonstration of at least one Joyce and Weil macro strategy and one Best Practice micro strategy acquired through teacher Education.

The Planning part should have the following:

a) An outline of the Unit Content – Examples will be provided in class.
b) A sequence of activities that will be taken when teaching the Unit

c) Assessment Strategies that will be used including when and how they will be used
d) Micro (things you have learned in class such as concept maps, wait time, cooperative groups, etc) and Macro teaching strategies that will be used in teaching the unit. The macro strategies will be adopted from: Joyce, B., Weil, M. & Calhoun, E. (2004). *Models of Teaching.* Boston, MA: Allyn & Bacon.

For the Macro strategies/Models identify at least one strategy from each of the family models in Parts II, III, IV, or V of the text. For each identified model/strategy respond to the following questions

a. What is the model identified – Provide a brief summary that describes the model
b. What specific sections of the unit lend themselves do this model and why?
c. How will you use this model when teaching about this content

Teaching:

The goal of this task is to give students an opportunity to analyze their own teaching with a focus on newly learned strategies. You will teach your developed unit to your students. You will videotape at least 3 lessons from your own class and analyze the video to find out how the strategies/models of teaching you identified come to play in your class. Select about 5 minutes of video clips that will illustrate student learning when you used at least two of the models of teaching discussed in class.
You will then present this video in class. In your presentation give a brief description of background information about the lesson in the video.

Reflection:
Reflect on your teaching and learning by responding to the following questions:
What aspects of the unit did you feel were best presented?
What aspects of the unit do you feel the students had most difficulty with? Why?
What assessment strategies provided you with most information about student learning of the key science concepts?
Which of the strategies you used do feel was the most effective? Why do you think so?

3. Mini lesson Presentations – 200 points

For this assignment you will be assigned a model of teaching from the different models presented in Joyce, Weil & Calhoun, (2004). You will develop a deep understanding of the model and its application to specific science content and grade level. You will prepare a mini lesson plan that

demonstrates how this model would look like in you classroom. During the date when we discuss the model in class you and your team partner will present this mini lesson to classmates. The lesson should specify grade level life science content standards and how to teach the content using a specific strategy. In this presentation besides the elements mentioned above you will incorporate the other elements of good lesson development modeled through out your education class.

Web Site Resources:

CSUSM Library: http://library.csusm.edu/
WebCT6: https://webct6.csusm.edu
National Science Teachers Association (NSTA): www.nsta.org
Eisenhower National Clearing House: www.enc.org
National Board for Professional Teaching Standards: http://www.nbpts.org/
California Science Education Standards:
http://www.cde.ca.gov/re/pn/fd/documents/sci-stnd.pdf

APENDIX A: Tentative Class Schedule

Class	Date	Topic	Readings & Work Due
1	1/23	Course Overview The Nature of Science and Inquiry Process in Science	Bring Syllabus to class
2	1/23	How do we make decisions about what to teach and how we teach it? -The Learning Cycle inquiry approach to instruction	Read Leaning Cycle Handout on WebCT RAJE* on LC
3	2/06	What are the overarching themes that we want our students to learn in science? -Focus on standards and Frameworks	Bring Science Education Standards to Class RAJE on Ch. 1
4	2/06	What are the best indicators that students have learned and understand the intended themes? -Focus on Assessment	RAJE on Ch. 2
5	2/13	How shall we sequence the learning activities so that students can learn the intended themes? -Focus on sequencing instruction	RAJE on Ch. 20
6	2/13	What methods of Teaching shall we use to make the content accessible to ALL students? -Introduction to the models of teaching	
7	3/06	Information Processing Teaching Models & Presentations -Inductive Thinking, Concept attainment, Picture word model presentations	RAJE on Ch. 3-9 as assigned **Planning Assignment Due**
8	3/06	Information Processing Teaching Models and presentations -Inquiry Thinking, Memorization & Art and Synectics models	RAJE on Ch. 3-9 as assigned
9	3/13	The Social Family Teaching Models & Presentations	RAJE on Ch. 10 and 11
10	3/13	Personal Family of Teaching Models & Presentations	RAJE on Ch. 12 and 13
11	4/03	Behavioral Family Models of Teaching & Presentations	RAJE on Ch. 14 – 16 **Teaching Videos Due**
12	4/03	Individual Differences and Diversity in Science	RAJE on Ch. 17 and 18
13	4/24	Planning, Teaching & Reflection Tasks Presentations	
14	4/24	Planning, Teaching & Reflection Tasks Presentations	**Completed Unit plans Due**
15	5/08	Planning, Teaching & Reflection Tasks Presentations	

** RAJE = Reading Accountability Journal Entry*