Secondary Science Methods-2001-2
(a component of EDSS 541)

Instructor: Joseph Keating, Ph.D.
Office: UH 309 **Phone:** 760-7504321
E-mail: jkeating@mailhost1.csusm.edu **Fax:** 760-7503237

Goals: Upon completion of this course, the preservice teacher will be able to formulate a basis to teach science in the secondary school in a manner that is exciting, creative and rigorous. To accomplish this, the candidate will formulate a personal framework based on both a historical/philosophical perspective as well as the knowledge of state and national reform documents. Using this framework, he (she) will be able to apply multiple strategies and resources in the development of unit plans, instructional delivery and assessment that utilize a student centered, problem solving approach to the teaching of science.

Major Themes/Objectives: (the student will have a broad perspective and practice in using.....)

1)major frameworks, programs and standards for Science Education in California and the United States

2)the history and philosophy of science

3) resources, materials available for science education including texts, lab manuals, technology and community related resources

4) methods of safe and effective science teaching methodologies that include experience in inquiry based learning, the use of the laboratory, community based or field work, research, enrichment activities and assessment.

5) detailed planning of curricula in science as well as in the incorporation of science in the design of interdisciplinary units.

6) SDAIE methods that enhance the science curriculum for culturally and linguistically diverse students.

7) a cognitively sound basis in applying science content

Required Texts:

Science Instruction in the Middle and High School (Chiappetta and Koballa)

California Frameworks in Science(State Dept of Education) California Safety Manual in Science(State Dept. of Education)

Use of Discrepant Events for Science Teachers (Keating)

Optional Texts:

The Demon Haunted World (Sagan)

Schedule: approximately 10 seminars @ 2.5 hrs.each from 5:30-8:00
*=Assignment/Reading due

Fall Semester:

September 10 (Monday)

- syllabus
- introductions/ discrepant event presentation "Mystery Box"
- Go over assignments for next class :sign up for DE (pairs), Science Frameworks jigsaw, readings from Text

September 24 (Monday)
- ***Science Frameworks and Standards Jigsaw***
- ***Discrepant Events (two pairs)**
- Go over assignments for next class: Readings due in Ch 1-2-3-4 (Nature of Science, History of Science Education and Nature of the Diverse Learner in Science and Learning in Middle and Secondary Schools)

October 25-28 CSTA Conference in Palm Springs (Optional/Extra)

October 15 (Monday)
- ***Discrepant Events (two pairs)**
- ** Open ended science experiments (in class)**
- ** Science Methods Textbook Discussion**(Chap 1-2-3-4 due)*

November 5 (Monday)
- ***discrepant event presentations (two pairs)***
- ** science teaching observation sheet discussion**
- ** Readings Part Two—Teaching Strategies** (Ch 5,6,7 due)*

November 26 (Monday)
- ***discrepant event presentations (two pairs)***
- * Science Safety Manual, and discussion with master teacher (California), Readings Chapter 9 (Safety in the Lab)

December 3 (Monday)
- ***Mini Lab modification and trial (SDAIE considerations)**
- ***discrepant event presentations (two pairs if necessary)**
- **Readings Chapter 8 Lab and Field Work**

December 10 (Monday)
- **Issues in Student Teaching**
- **Readings in Text (Chapter 12-13 Planning for instruction)**

<u>Spring Semester</u>: (Proposed Sessions)—During Intercession Read Chapter 10 Computers and Electronic Technology; Chapter 11 Managing the Learning Environment and Part Four (Assessment in Science) Chapter 14 and Part Five (Professional Development) Chapter 15

February 25 (Monday) (no formal class meeting)

- ***Independent viewing and evaluation of computer software** (see attached rating sheet) at San Diego Co. Office of Education Computer Lab (Joe Rindone Center)—Linda Vista Drive **To Web Page**
- **Video resources and internet resources To Web Page**

March 11 (Monday)

- ***Internet resources** for science evaluation (please review three sites and include 1) copies of URL and a representative page; 2) rating and rationale (1-5); 3) applicable to you as a teacher or your students;
  4) how would you use
- ***Video resources (one taped science program)** bring and discuss 1) strengths and weaknesses; 2) rating and rationale (1-5) 3) potential application to science classroom
- **Software resources (at least three)**
- bring and discuss 1) strengths and weaknesses; 2) rating and rationale (1-5) 3) potential application to science classroom

April ? (TBA) in San Diego (Friday/Saturday)

- National Science Teachers Association Conference **(Required—one session)**

May 6 (Monday)

- Debriefing of course/student teaching/jobs
- Bring and Share an ***example** of an **authentic assessment** (journals, portfolio, performance based exam etc.) that you have actually used this year in teaching science.

Assignments/Requirements:

(each will count as approximately 10% (unless noted) of final grade for this portion of the course) Assignments are due on date and will not be accepted late

1) Attendance/participation (two pt. per class) 20 pts.
2) Science Methods Text Readings/Discussion/Notes(10 pts)
3) Jigsaw of science frameworks and standards 5pts.
4) Evaluation sheets on 3 computer programs (10 pts)
5) Evaluation of science internet sites (10 pts)
6) Inquiry---Discrepant event presentation(s) 10 pts
7) Mini lab SDAIE modification and presentation 10 pts
8) Evaluation sheet for Science TV Program/ Video resources 5pts.
9) Observation of science lesson 10pts
10) Example of authentic assessment 10 pts

Optional/Extra credit: (maximum 10 pts)

1) Directorship (5 pts.)
2) SDSEA or CSTA or other Conference (5 pts. one day)
3) Book Report on high interest science book (5 pts.))