

EDSS 545 a and b Secondary Science Methods (3.0 Credits)

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Description/ Goals: This course will be held both first and second semester for a total of 3 credits (approximately 22 contact hours per semester). 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 inquiry based application of science content

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 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. The following TPE's are addressed in this course:

Primary Emphasis

TPE 1B Subject specific pedagogical skills

TPE 3 Interpretation and Use of Assessments

TPE 4 Making content assessable

TPE 6C Developmentally Appropriate for 9-12

TPE 6D Developmentally Appropriate for special education

TPE 9 Instructional Planning

TPE 10 Instructional Time

Secondary Emphasis:

TPE 2 Monitoring student learning during instruction

TPE 5 Student Engagement

TPE 7 Teaching Second Language Learners

TPE 11 Social Environment

TPE 12 Professional, Legal and Ethical Obligations

TPE 13 Professional Growth

Required Texts:

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

California Frameworks in Science(State Dept of Education)

Inclusion (Choate)

Optional Texts:

The Demon Haunted World (Sagan)

The Structure of Scientific Revolutions (Kuhn)

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

Use of Discrepant Events for Science Teachers (Keating)

Schedule: approximately 7-8 seminars @ 3.0 hrs.each from 5:30-8:30

***=Assignment/Reading due**

Fall Semester:

September 30 (Monday)

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

October 7 (Monday)

- ***Science Frameworks and Standards Jigsaw***
- ***Discrepant Events (two-three pairs)**
- Go over assignments for next class: Readings due in Ch 1-2 (Nature of Science, History of Science Education)

October 21 (Monday)

- ***Discrepant Events (two-three pairs)**
- ***The use of Open ended science experiments (in class)**
- *** Science Methods Textbook Discussion(Chap 1-2 due)***
- Go over assignments for next class : Reading log Ch 3 and 4

November 4 (Monday)

- ***discrepant event presentations (two-three pairs)***

- *** discussion of science teaching observation sheet and science safety issues with master teacher**
- *** Readings Part Two—Teaching Strategies due** (Ch 3 and 4)*
- Go over assignments for next class: reading log Ch 9 (science safety); observation of science teaching; discussion notes from master teacher safety procedures

November 18 (Monday)

- ***discrepant event presentations (two-three pairs)***
- *** Science Safety Manual** (state dept of ed—optional), and discussion with master teacher (California), Readings Chapter 9 (Safety in the Lab)
- *** observation of science teacher assignment** (see handout)
- Go over assignments for next class: Reading logs for Ch 5 and 6

November 25 (Monday)

- ***Issues in Student Teaching**
- ***discrepant event presentations (two-three pairs if necessary)**
- **Discussion of Reading logs in Chapter 5 and 6**
- Go over assignments for next class: Reading log Ch 7

December 9 (Monday)

- **Issues in Student Teaching**
- **Discussion of Reading log in Text Ch 7**
- ***discrepant event presentations (two-three pairs if necessary)**
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- Go over Assignment for intercession (see readings below); video and internet evaluations (use evaluation sheets provided)

Spring Semester: (Proposed Sessions)—During Intercession Read and prepare a reading log for Ch 8 and 9; Chapter 10 Computers and Electronic Technology; Chapter 11 Managing the Learning Environment and Part Four (Assessment in Science); Ch 12-13 Planning for instruction; Chapter 14 and Part Five (Professional Development) Chapter 15 and Choate Ch 13 Science Instruction for Inclusion

Other assignments due:

- ***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

February _____(Monday)

- **Discussion of ratings of Video resources and internet resources**
- **Ch 8 and 9 Reading logs due**
- Go over assignments for next class: Ch 10; prepare for video-tape of science lesson due on April____

February ____ (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

February ____ (Monday)

- **Discussion of Software resources from Rindone Center (at least three)** bring and discuss 1) strengths and weaknesses; 2) rating and rationale (1-5) 3) potential application to science classroom
- **Discussion of Ch 10 (Technology and Science)**
- Go over assignments for next class: Ch 13 Choate; Mini-lab SDAIE adaptation (and trial)

March ____ (Monday)

- **Mini Lab modification and trial (SDAIE considerations)**
- Discussion of Choate Ch 13
- Go over assignments for next class: Ch 11

March ____ (Monday)

- Presentation and application of Probeware in a science class: Hannah Finney (Rancho Bernardo HS)
 - Discussion of Ch 11
 - Go over assignments for next class: Ch 12-13;
- Prepare an Example of authentic assessment used in your teaching

April ____ (Monday)

- 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.
 - Discussion of Ch 12-13
 - Go over assignments for next class: Ch 14-15;
- Reading of high interest science related book (brief rating and discussion of each); video-tape of science lesson

April ____ (Monday)

- Share video tape of science lesson
- Discussion of Ch 14-15
- Discussion of High interest science related book report
- Go over assignments for next class: NONE

May ___(Monday)

- Debriefing of course/student teaching/jobs: meet at restaurant

Assignments/Requirements: (each will count as the points noted. The final grade for part a and b will be the % of total points earned that semester converted to a letter grade (90-100=A etc.) Assignments are due on time and will not be accepted late.

- 1) Attendance/participation (two pt. per class) 28 pts.
- 2) Science Methods Text Readings/Discussion/Notes(10 pts) **TPE 1B, 2, 3,4, 5, 6c, 6d, 7, 9, 10, 11, 12, 13**
- 3) Jigsaw of science frameworks and standards 5pts. **TPE 6C, 12, 13**
- 4) Evaluation sheets on 3 computer programs (5 pts) **TPE 1B, 4, 5, 6C**
- 5) Evaluation of science internet sites (5 pts) **TPE 1B, 4, 5, 6C**
- 6) Inquiry---Discrepant event presentation(s) 10 pts **TPE 1B, 2, 3, 4, 5, 6c, 6d, 7, 9, 10, 11**
- 7) Mini lab SDAIE modification and presentation 10 pts **TPE 1B, 2, 3, 4, 5, 6c, 6d, 7, 9, 10, 11**
- 8) Evaluation sheet for Science TV Program/ Video resources 5pts. **TPE 1B, 4, 5, 6C**
- 9) Observation of science lesson (5 pts) **TPE 1B, 2, 3, 4, 5, 6c, 6d, 7, 9, 10, 11**
- 10) Edited video tape of inquiry based lesson (5pts) **TPE 1b. 2, 4, 9, 10**
- 11) Example of authentic assessment with rubric used in Science (5 pts) **TPE 2,3,4**
- 12) Book Report on high interest science book (5 pts.) **TPE 12, 13**

Optional/Extra credit: (maximum 10 pts)

- 1) Directorship (5 pts.) **TPE 12, 13**
- 2) SDSEA or CSTA or other Conference (5 pts. one day) **TPE 12, 13**