ARGOSY UNIVERSITY/

School of Education
Multiple and Single Subject
Teacher Credential Prep Program

COURSE SYLLABUS

E6906	Science Education in Elementary Schools
COURSE NUMBER	**COURSE TITLE**

Spring	Sat/ Sun	6-9pm	Pt Richmond
TERM	**DAY**	**TIME**	**SITE**

Mission Statement

Argosy University is a private institution of higher education (IHE) whose mission is to facilitate high quality learning in the practitioner's field of study. Within the School of Education that charge is manifested in providing high quality professional programs at the graduate level including credentialing programs and courses of study leading to masters and doctoral degrees in education. Each program offered within the School of Education is designed to install knowledge and skills related to the professional practices associated with the learner's career aspirations. At the same time, programs are infused with the values of higher education, including those of social responsibility and ethical conduct. Aspects of socio-economic, community and cultural diversity are embedded as topics within course dialogues and presentations.

Texts:

Krajcik, Joseph S. et al. (2003). Teaching science in elementary and middle school classrooms a project-based approach 2nd Edition, New York, NY: McGraw-Hill.

Instructor:

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Biography: Dr AdisaThomas is a part-time professor for Argosy University**,** in the teacher Prep program at Pt Richmond and San Francisco State University. She holds an Ed D in Curriculum and Instruction and Educational Technology. She has over 16 years of experience as a teacher, and over 8 years of teaching at the graduate university level. She engages in research and has organized conferences and presented her research in a number of countries.

Purpose and Goals

The intent of this course is to help students develop the knowledge and skills necessary to effectively teach elementary science in a public school classroom in California, where there is a diversity of student ability, culture, socio-economic status, and learning styles.

Course goals include:

1. to gain an understanding of the answers to the following focus questions;
   - How do children develop understanding of elementary science curriculum content?
   - How does the culture of the classroom affect communication and learning about science content?
   - How does the teacher help all children become successful in learning science content?
2. to gain knowledge of the aims of science in K-12 education
3. to demonstrate knowledge and understanding of the national Science Education Standards and California Science Content Standards
4. to gain an understanding of the role of the teacher in understanding effective science instruction
5. to gain an understanding of the nature of the learning tasks in effective science instruction
6. to demonstrate a understanding of the basic science themes (energy, evolution, patterns of change, scale and structure, stability, and systems and interactions) and basic science concepts in the fields of physical, earth, and life science
7. to use the constructivist model of instruction to teach science in a student-centered manner to gain an understanding of the affect and influence of students' cultures, and the culture of the classroom, on effective science instruction
8. to develop an understanding of major learning theories through various applications in course assignments to develop the ability to identify students' learning styles, learning strengths and weaknesses, and other factors affecting

the science learning of all students, including English language learners and students with special needs

9. to develop lesson plans in science that implement strategies that result in increasing students' interest in and enthusiasm for the content
10. to identify, analyze, and develop science lesson plans that include a variety of multicultural/multilingual learner-centered instructional strategies, such as scaffolding, maximizing comprehensible input, and the elements of SDAIE
    to develop skill in making appropriate choices of materials (i.e., curriculum kits, science programs, textbooks, equipment, ancillary materials) to support, enhance, and reinforce science skills
11. to develop skills in making appropriate choices of technology (i.e., telecommunications, software, research databases, web sites) to support, enhance, and reinforce science skills

Course Description:

This course is focused on the theoretical concepts, instructional methods and materials for use in science education and curriculum integration in elementary schools. Students will be introduced to curriculum planning, organization and assessment in elementary science; the role of culture in science and visual arts learning; using technology to enhance children's curriculum understanding, performance and progress; and the integration of science with other curriculum areas. Students will have a series of first-hand experiences in class in-group activities.

Incoming Competency of Student Expected by Instructor:

Some familiarity with K-12 educational issues related to motivation, governance, ethics, culture, and propriety. Additionally, students are expected to be skilled writers, and moderate word processing skills. Additional requirements:

a. Attendance: Students must meet all attendance requirements essential to learning, including arriving to class on time so as not to be disruptive to other students. Students are expected to notify the instructor of any anticipated absence.
b. Preparation: Students are expected to study their assigned case and/or selected readings, and be prepared to discuss them in class, students will be prepared discuss course content on the first class meeting.
c. Academic Integrity: All work submitted for credit must be the original work of the student, or if information is drawn from elsewhere, proper attribution is required
Students are expected to respect and uphold standards of honesty in submitting written work to instructors. Though occurring in many forms, plagiarism in essence involves the presentation of another person's work as if it were the work of the presenter. The consequences of plagiarism are often severe. Students guilty of plagiarism may receive a failing grade in the courses and may be expelled from the program. A notation concerning the plagiarized work will become part of the student's permanent academic filed maintained by the program.

Integrated Competencies

Special Education
Consistent with the intent to offer a seamless teaching credential in the School of Education, this course will demonstrate the collaborative infusion of special education competencies that reflect inclusive educational practices through a focus on teaching to multiple intelligences.

Teaching English Learners
In designing this program, preparation of teachers for the diversity of languages encountered in the classroom in met through the content and experiences within the credential program.

Technology
This course integrates technology competencies to prepare our candidates to use technologies, emphasizing their use in both teaching practice and student learning. Candidates are expected to use technology in professional practice, as well as researching the topics discussed in this course. Additional uses of technology will be discussed in class and emphasized in the course reader.

- -Students will communicate through email with professors and classmates as needed each week
- -Students will download and print syllabi
- -Students will use Argosy University's website for research and information retrieval.

Course Statement of Objectives:

Upon successful completion of this course, students should be expected to:

1. Understand and articulate answers to the following focus questions:
   a. How do children develop an understanding of elementary science and visual arts curriculum content?
   b. How does the culture of the classroom affect communication and learning about science and visual arts content?
   c. How does the teacher help all children become successful in learning science and visual arts content?
   2. Know the aims of science and the visual arts in K-12 education.
   3. Demonstrate knowledge and understanding of the national Science Education Standards and the California Science Content Standards.
   8. Demonstrate and understand the Scientific Method as the means by which scientific knowledge is gained and shared.
   9. Demonstrate an understanding of the basic science themes (energy, evolution, patterns of change, scale and structure, stability, and systems and interactions) and basic science concepts in the fields of physical, earth, and life science.
   10. Use the constructivist model of Instruction to teach science in a contemporary manner.

11. Demonstrate confidence in leading and performing investigations designed to teach science concepts, science process skills, and scientific attitudes.
12. Understand the effect and influence of students' cultures, and the culture of the classroom, on effective science and visual arts instruction.
13. Develop an understanding of major learning theories through various applications in course assignments.
14. Demonstrate specific strategies for motivating students to perform toward academic excellence in science and the visual arts.
15. Develop the ability to identify students' learning styles, learning strengths and weaknesses, and other factors affecting the science and visual arts learning of all students, including English language learners and students with special needs.
16. Produce lesson plans that implement strategies resulting in increasing student interest in and enthusiasm for science and the visual arts.
17. Identify, analyze, and develop lesson plans that include a variety of multicultural/multilingual learner- centered instructional strategies, such as scaffolding, maximizing comprehension
18. Produce a variety of age, ability, language, and task appropriate lesson plans in science and the visual arts.
19. Develop skills in making appropriate choices of technology to support, enhance, and reinforce science and visual arts skills.

Critical Assessment Tasks:

1. **PARTICIPATION, COLLABORATION AND PROFESSIONALISM** (individual)

- Students will engage in active learning each class session, and will be expected to actively participate, collaborate, and demonstrate professionalism at all times.
- Do you participate in class discussions productively, sharing your knowledge and understandings?
- Do you interact productively with your peers, taking on a variety of roles (leader, follower, etc.)?
- Do you contribute appropriately to group work—do you "do your share"?
- Are you able to accept others' opinions?
- Are you supportive of others' ideas?
- Do you support your peers during their presentations?
- Can you monitor and adjust your participation to allow for others' ideas as well your own to be heard?
- Do you show a positive attitude and disposition towards teaching all students?
- Do you exhibit professional behavior at all times?

Rubric for PCP: Participation, Collaboration and Professionalism

	Excellent 11-14 points	Acceptable 7-10 points	Unacceptable 0-6 points
Attitude	Consistently displays a positive attitude. May offer constructive criticism and include alternatives that show initiative.	Displays a positive attitude. May offer constructive criticism and include alternatives that show initiative.	Seldom has a positive attitude. Often is critical. Does not offer alternative solutions to criticism.
Participation	Attends every class, always on time and well prepared, and never leaves early. Gives closest attention to class activities and speakers.	Attends every class, on time and prepared, and never leaves early. Gives most attention to class activities and speakers.	Is not always ready when class time begins. Doesn't give full attention in class; sometimes talks when others are speaking.
Professionalism	Consistently behaves talks and works in a professional manner, regardless of task/topic.	Most of the time, behaves talks and works in a professional manner, regardless of task or topic.	Seldom behaves, talks, and works in a professional manner, regardless of task or topic.
Collaboration	Consistently listens to, shares with, and supports the efforts of others. Tries to keep people working well together.	Most of the time listens to, shares with, and supports the efforts of others, but sometimes is not a good team member.	Rarely listens to, shares with, and supports the efforts of others. Is not always a good team player.
Contributions	Consistently provides useful ideas; always stays focused on the task. Exhibits a lot of effort and valuable contributions.	Most of the time provides useful ideas; most of the time stays focused. A satisfactory group member who does what is required.	Rarely provides useful ideas; not always focused. Reluctant to participate. Lets others take charge and participate.
Disposition toward teaching	Consistently demonstrates concern in learning to teach all children. Always demonstrates strong commitment toward developing (a) an understanding of children, (b) teaching strategies, and (c) knowledge of the CA Standards for the Teaching Profession (CSTP), Teacher Performance Expectations (TPE), and CA Science Content Standards.	Most of the time demonstrates concern in learning to teach all children. Often demonstrates commitment toward developing (a) an understanding of children, (b) teaching strategies, and (c) knowledge of the CSTP's, TPE's, and CA Science Content Standards.	Rarely shows concern in learning to teach all children. Rarely demonstrates commitment toward developing (a) an understanding of children, (b) teaching strategies, and (c) knowledge of the CSTP's, TPE's, and CA Science Standards.
Leadership	Shows strength through leadership in different class activities; other students respect you as a leader.	Effectively participates and contributes, but rarely shows leadership qualities.	Does not show leadership in any area of class.

You will do a self assessment, using this rubric, and write a 1-2 page rationale.

Total Score: _____

The professor will also do an assessment, using this rubric.

A. Making Subject Matter Comprehensible to Students

TPE 1: Specific pedagogical skills for subject matter instruction

TPE 1A: Subject-specific pedagogical skills for Multi-Subject teaching

TPE 1B: Subject-specific pedagogical skills for Single Subject teaching

B. Assessing Student Learning

TPE 2: Monitoring student learning during instruction

TPE 3: Interpretation and use of assessments

C. Engaging and Supporting Students in Learning

TPE 4: Making content accessible

TPE 5: Student engagement

TPE 6: Developmentally appropriate teaching practices:

TPE 6A: Developmentally appropriate teaching practices in K-3

TPE 6B: Developmentally appropriate teaching practices in 4-8

TPE 6C: Developmentally appropriate teaching practices in 8-12
TPE 7: Teaching English Language Learners

D. Planning Instruction and Designing Learning Experiences

TPE 8: Learning About Students
TPE 9: Instructional Planning

E. Creating and Maintaining Effective Environments for Student Learning

TPE 10: Instructional Time
TPE 11: Social Environment

F. Developing as a Professional

TPE 12: Professional, legal and ethical obligations
TPE 13: Professional growth

2. Professional Portfolio

A requirement of the Credential Program is the development of the Professional Portfolio. Students will begin the development of the Professional Portfolio in the Curriculum and Instruction class, where they will receive specific instructions regarding the appearance and components of the Portfolio. Recommendations will be made during this course by the instructor regarding the inclusion in the Portfolio of the candidates' work, which represents their teaching and learning of science and the visual arts. At the conclusion of their Program, students will have a Portfolio that represents them as a Professional Teacher who has had a wide variety of significant experiences that have contributed positively to their successful completion of their Credential Program.

Write a 2 to 3 page paper highlighting the TPEs and how your education and student teaching experiences have addressed these.

At the conclusion of the credential program the student will be able to:

1. Demonstrate an understanding of key issues, theories, and practices in public school teaching and learning in California, including state-wide content standards, and ethical, philosophical, sociological, developmental, historical, pedagogical, political, and theoretical foundations in education.
2. Utilize best practices in curriculum planning, teaching and learning, classroom management, educational technology, and assessment of student learning outcomes in the teaching of individuals and groups from diverse backgrounds and with special needs.
3. Demonstrate an understanding of and apply core skills in the teaching of a single subject or multiple contents areas (e.g. language and literacy, social students, math, science, health, and/or special education) in an elementary, middle school and secondary school setting.
4. Demonstrate an understanding of and apply skills in teaching in culturally diverse elementary, middle and/or secondary school settings and communities.
5. Demonstrate and understanding of, articulate, and critically reflect upon one's own teaching style and philosophy.
6. Conduct research, write, speak, and listen effectively and with integrity utilizing traditional media and institutional technology.

3. Science Web Sites Activity

This assignment will give students the opportunity to explore web sites in the area of elementary science education. Students will write three (3) one page papers describing three different sites, and will critique the sites according to their appropriateness for the elementary school classroom. Students will provide each classmate with a copy of each paper for future reference.

What following is a list of web sites that are linked to various sites for you to explore**.** You may also self-select a web site of your choice.

Awesome Library - K-12 Education Directory

http://www.awesomelibrary.org/

Blue Web'n Learning Sites Library

http://www.kn.pacbell.com/wired/bluewebn/

California Heritage K-12 Curriculum

http://sunsite.berkeley.edu/calheritage/k12/

Home Page: American Memory from the Library of Congress

http://lcweb2.loc.gov/ammem/

College of Education Web Links

http://edweb.sdsu.edu/links/index.html

California State Board of Education: Standards, Curriculum Materials, Education Policies, Kindergarten Grade Twelve

http://www.cde.ca.gov/board/

ePALS Classroom Exchange

http://www.epals.com/

Lightspan - Collaborative learning projects, activities, articles, and more for teachers and their students.

http://www.lightspan.com/teacher/pages/projects/default.asp?_prod=LS&_nav=T2_proj

Welcome to the IECC

http://www.teaching.com/iecc/

Kids' Space Connection

http://www.ks-connection.org/

Online rubric maker
rubistar.4teachers.org

4. Literature Connections: Partner Presentations

With a partner, students will select two children's books as resources for teaching science in context. The books should make some interesting links to science education, and should also provide visual art stimulation. During a class session, students will do a presentation of the books they have chosen, focusing on their potential for effective application to the teaching of some aspect of science. Students will write a one page description of each book, and how it could be used in teaching science. Identify the science grade level9s) and the applicable content standard(s). Students will provide each classmate with a copy of the literature connections paper to use as future resources.

Presentation Rubric

Base Team Name: _____
Members' Names: _____ _____
_____ _____
_____ _____

Date: _____ Topic: _____

Dimensions:	1	2	3	4
Understanding Content	Not Yet	Partial	Adequate	Thorough
Presentation/ overheads/handouts well organized	Sleep Inducing	Boring	Interest Holding	Dynamic and Compelling
Creativity	Undeveloped or Rote Ideas	Under-developed Ideas	Good Ideas That Are Not Borrowed	Clever and Original Ideas
Effort and Preparation	Minimal or None	Sufficient	More than Sufficient	Considerable

Total Score: _____
(Maximum = 16)

Commendations:

Recommendations:

Based Upon: The Rubric Way: Using MI to Assess Understanding David Lazear Zephyr Press 1998

5. Along with another student (pairs of two) students will develop a five day thematic unit plan based on instructor designed thematic planning sheets. Each group will make copies for all students in the course. The unit plans will be presented the last class and are due at that time.

Weekend #1 Saturday

Assignment due first Saturday we meet
Pick a science area of concentration and draw a poster that can be used to introduce an area of study to a class of elementary school students based on standards for k-6 grade. It must have at least 10 items on it.

1. Science Autobiography

   Students will reflect on their own science development. In a 2-page narrative, they will answer these questions and add other thoughts that occur to them as they reflect upon their own literacy development:
   - How did you come to learn about science?
   - What are your earliest science memories?
   - What books did you use in learning about science?
   - What kinds of experiments have you engaged in regarding science?
   - Do you have positive or negative experiences about science?
   - Who if anyone was important in developing your attitude toward science?
   - What are your school science memories?

Lesson 1 Class introduction, administration and discussion of assignments.
Introduction to Science Content Standards and Examination of texts

Select area of concentration: Characteristics of Matter; Heat and Energy; Electricity; Magnetism; Sound; Light, Lenses and Color; Air and Air Pressure; Weather and Climate; Flight; Space Science; Planets and Stars; Oceans; Plants and Fungi Kingdom; Animal Kingdom; Nutrition and Health; Fitness; Energy; the Environment

Video: PBS Special: First to Worst

Lesson 2 Beginning to teach science: Science themes, Constructivist Model of instruction

Lesson 3 The Presenting Science to Children; safety in the science class; science process skills and scientific attitudes. Individual student content presentation on ***Heat and Energy***

Lesson 4 Elementary science and visual arts curricula. Multiple Intelligences
Literature Connections: Individual student content presentations on ***Electricity***

Lesson 5 Learning styles and multiple intelligences; inclusion and the requirements of students' with special needs; authentic assessment in science. Individual student content presentation on ***Magnetism***

Week End #2

Lesson 6 Thematic Planning; Individual student content presentation on ***Sound***

Lesson 7 Creating assessments that are curriculum based. Authentic assessments Individual student content presentation on ***Light, Lenses and Color***

Lesson 8 Introduction to Web Site Assignment Individual student content presentation on ***Weather and Climate*** - **student presentations**

Lesson 9 Web site presentations, Individual student content presentation on ***Flight***

Lesson 10 Web site presentations, Individual student content presentation on ***Space Science***.

Lesson 11 The National Science Education Standards: how to apply. Individual student content presentation on ***Planets and Stars*** Web Site Presentations -

Lesson 12 Individual, student; content presentations on ***Oceans, Plant Kingdoms, Animal Kingdoms.***

Lesson 13 Culminating Activity and Reflections/Thematic Plans student presentations; Course Evaluation

Grading Criteria:

Written work should reflect the following:

- Clarity and completeness
- Accuracy for the assignment as given
- Insights/reflections/analysis
- Connectedness to class readings, discussions, lectures, experiences
- Overall impression

Oral class presentation should reflect the following:

- Appropriateness to the subject at hand
- Respect for alternative viewpoints
- Ability to tie together multiple components
- Appreciation for the complexity of the material

Standards Alignment

The course objectives, assignment and assessments have been aligned to the following Argosy Standards. They are addressed in the class as follows:

Standard 3: Relationships between theory and practice
Standard 4: Pedagogical thought and reflective practice
Standard 5: Equity, Diversity, and access to the core curriculum

Standard10: Preparation for learning to create a supportive, health environment for student learning
Standard11: Preparation to use educational ideas and research
Standard12: Professional perspective toward student learning and teaching profession
Standard13: Preparation to teach English learners

Grading Standard:

Based on class rubric and "A to C" grading standards assigned. Student scoring below a "C" grade will be asked to redo the assignment based on instructor comments.

The Argosy University Statement Regarding Americans with Disabilities Act (ADA):

It is the policy of Argosy University to make reasonable accommodations for qualified students with disabilities, in accordance with the Americans With Disabilities Act (ADA). If you are a student with a disabling condition and need accommodations in order to complete your requirements, please make an appointment with the course instructor as soon as possible to discuss your request. Information disclosed by a student after completing the Final Examination cannot be considered in evaluating the student's performance. So, please make this an optimal experience by letting the instruction know of any accommodations needed at the outset of the course. All information discussed must be held in confidence.

The Argosy University Statement Regarding Diversity:

The Argosy University provides equitable access through its services and programs to students of any social, geographic and cultural background, regardless of gender, and strives to prepare all candidates to work with and provide services to diverse populations. Argosy demonstrates its commitment to diversity through the development and support of a diverse educational community.