

## UTSA COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT

Department of Interdisciplinary Studies and Curriculum & Instruction

C&I 4403 Approaches to Teaching Math & Science Grades EC-4

Spring 2008

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### **PREREQUISITES**

Completion of curriculum requirements and acceptance into the teacher certification program.

### **COURSE DESCRIPTION**

A study of pedagogical approaches and materials designed to support young children's meaningful exploration, discovery, and construction of basic concepts and skills in mathematics and science in preschool through grade 4. Emphasis will be on the interrelatedness of math and science in the curriculum; how to provide an effective learning environment; how to plan and implement inquiry-based math and science lessons; assessment of student learning; and the use of an integrated curriculum approach to teaching. Twenty-five hours of field-based experience in a preschool/elementary school classroom during the semester are required.

### **FIELD-BASED DESIGNATION**

Students enrolled in field-based classes are required to pass a criminal history screening prior to participation in learning opportunities with children. Extensive field experiences, offering candidates opportunities to interact with diverse children, are closely linked with coursework in C&I 4403. These field hours allow students to extend and refine their understanding of children's learning and development and teachers' work, under the supervision of university professors and cooperating teachers in elementary schools). **ALL FIELD EXPERIENCES MUST BE UNDER SUPERVISION.**

The student must complete a minimum of 25 hours of field work in an assigned prek-5 classroom. Completing the 25 hours of observation is a requirement to pass the course. It is expected that students will be interacting with children during field placement hours, not merely observing. Time spent observing students during specials (Art, PE, Music, etc.), does not count toward field placement hours, unless it's Math or Science relevant. Specials observation examples-Science Lab, a PE lesson that involves Science/Health (Circulatory System), a library storytelling activity, and computer lab Math or Science programs. Field work will consist of assisting children during learning activities, teaching of actual lessons and lesson planning with CT.

### **MISSION**

The mission of the Department of Interdisciplinary Learning and Teaching is to foster the intellectual and professional growth and integrity of students and faculty through critical reflection and dialogue, civic responsibility, and leadership. This mission will be accomplished by nurturing a community of interdisciplinary learners who:

- Promote excellence in academic and pedagogical knowledge and research
- Engage in reflective practice
- Embody a strong professional identity and can articulate their philosophies and values

- Value diversity and multiple perspectives
- Promote equality and social justice
- Care about their students and their profession
- Advocate for educational change and reform

### **GOALS OF THE DEPARTMENT OF INTERDISCIPLINARY LEARNING AND TEACHING:**

- Acquire and demonstrate content and discipline knowledge
- Demonstrate an awareness and acknowledgement of and engagement in research-based, reflective, culturally responsive practices
- Are producers, disseminators, and critical consumers of research
- Demonstrate an awareness and acknowledgement of and engagement in social justice and equitable practices
- Articulate their professional philosophy and demonstrate a strong professional identity

### **REQUIRED TEXTS**

Burris, A. C. (2005). Understanding the math you teach: Content and methods for prekindergarten through grade 4. Upper Saddle River, NJ: Pearson/Merrill Prentice Hall.

Carin, A. A., Bass, J. E. & Contant, T. L. (2005). Teaching science as inquiry (10<sup>th</sup> ed.). Upper Saddle River, NJ: Pearson/Merrill Prentice Hall.

TEKS for Math and Science (EC-4): <http://www.tea.state.tx.us/teks/index.html> (Download Math & Science TEKS, for assigned grade level)

Review safety handbook: <http://www.utdanacenter.org/>

### **REQUIRED MATERIALS**

Textbooks for every lecture.

Supplies—glue, scissors, markers, crayons and stapler

Binder any size with dividers:

- 1) Fitness to Teach Policy
- 2) Bloom's Taxonomy/Lesson Plan Information (different from the lesson plan folder)
- 3) Community Observation
- 4) Math Notes
- 5) Science Notes
- 6) Quizzes
- 7) Activities
- 8) Reflections—opening class question, lecture closure, “what did you learn today” & dialogue reflection questions
- 9) Assignments—curriculum critique, webquests, and school community ethnography
- 10) Math/Science Literature List

A pocket folder with brads for submitting lesson plans. Label front of folder with name. Lesson plans to be grades attach in brads.

### **RATIONALE**

The Early Childhood through grade 4, provide prime opportunities for teachers to work with students on developing, exploring, and understanding the mathematics and science curricula. Teacher candidates must learn how to apply the knowledge and concepts of this curriculum in classroom settings using a variety of teaching models, explorations, and strategies. This will be done in an EC-4 school environment that will allow candidates to work directly with classroom teachers and their students in an ongoing school context of learning and reflection. Emphasis will be placed on constructivist and socio-constructivist theoretical frameworks for the self-

development of all learners, as well as the implications for integrating mathematics and science instruction.

## **OBJECTIVES**

1. To examine the PreKindergarten Guidelines and K-4 Texas Essential Knowledge and Skills in science and mathematics throughout the EC-4 continuum, and relate these standards to research-based instructional practice in diverse settings.
2. To develop an understanding of various teaching models that reflect research-based instructional methods and strategies and to be able to apply this knowledge to teaching and learning specifically related to science and mathematics.
3. To develop an understanding of and facility in using manipulatives and lab materials in mathematics and science teaching, that also promotes safety awareness for children in grades EC-4.
4. To emphasize the interdisciplinary nature of instruction in the early grades, while systematically developing foundational competencies in science and mathematics.
5. To plan, implement, monitor, assess and adjust instruction to enhance the learning of all students within classrooms (to include lesson planning and project development that is anti-bias, diverse, and multicultural and uses school and community resources).
6. To develop and apply understandings of diverse children's language, literacy and culture and to provide active, meaningful learning opportunities consistent with community norms and the goals of the instructional program.
7. To become familiar with a variety of available programs, approaches, and possible classroom organization relevant to instruction in science and mathematics.
8. To implement and monitor the use of technology as a tool for teaching and learning.
9. To apply principles of classroom management and positive discipline in instructional settings.
10. To develop and refine knowledge of authentic assessments in mathematics and science, and to apply this understanding to ongoing assessment in the classroom.

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## **COURSE REQUIREMENTS/ASSIGNMENTS**

### **(1) Professionalism, Attendance, and Preparedness (30 points)**

#### ***Professionalism***

Download the UTSA College of Education and Human Development's Fitness-to-Teach policy at <http://utsa.edu/hop/chapter5/5-17.cfm>, sign and place in binder divider 1). The Fitness to Teach policy is intended to understand the requirements of professional behavior as a preservice teacher in the COEHD.

- Students must demonstrate professional conduct that is appropriate for teaching children in educational settings. This includes arriving on time for field-based work, notifying the cooperating teacher and instructor of an absence and arriving on time with all required materials. Students must adhere to all policies and regulations of the school including

appropriate attire for professionals (no jeans, flip flops, tank tops, and sheer or low cut blouses). The way we dress and act is important to our projection as teachers to both the students in the school as well as to the teachers and administrators. Any breach of professional ethics or conduct deemed unsuitable by the cooperating teacher in the field placement and the course instructor could result in the student being dropped from the course and disciplinary action by the university following the policies specified in the Fitness to Teach Guidelines and/or the UTSA Faculty Handbook.

- Avoid using cell phones during field based classroom, unless it's during teacher lunch time or conference time.
- Respect all confidentiality policies and FERPA (Family, Educational, Rights, Policies Act). These policies will be discussed more in class.

### ***Attendance***

- While I am deeply empathetic and sympathetic to the fact that “life happens” and can get in the way of your studies, attendance is crucial. Attendance of scheduled classes and field-based experience are **mandatory** for the completion of this course. Activities and field experiences designed for class participation cannot be replicated apart from class sessions. Science Inventor cards are the attendance sign in and will be checked by the student at the beginning of class. If student is tardy, document on attendance card T for tardy. **In order to be considered present for the class, the student must arrive on time and remain for the entire class period.** No absences are allowed in this course, except for extreme emergencies (“emergency” is left to the discretion of the instructor). If a doctor’s note can be provided, this will become an excused absence. Upon the **second** unexcused absence of a student in a one day week course, the student will receive a reduction in the final grade by one letter grade. Each additional absence will result in a subsequent reduction of the final grade by an additional letter grade and the instructor will initiate a Fitness to Teach Policy.
- If student is absent, refer to a class peer to provide any missed handouts and information, before the next lecture date.
- Tardiness has the potential to become absences.

### ***Preparedness***

- An agenda is posted at the beginning of class.
- Textbook readings: According to the assignments in the course calendar, students are expected to prepare in advance for lecture. **Therefore, textbooks are required for every lecture.** The lack of preparation will result in reduction of professionalism points and the implementation of the Fitness to Teach Policy.
- WebCT is our form of communication. Check WebCT by section on Sun at 9pm for announcements and posted documents.
- **The following conditions apply to all assignments:**
  1. Assignments must be turned in on or before the specified due date. Only emergency situations will be evaluated at the discretion of the instructor.
  2. No incomplete assignments will be accepted. No resubmissions will be allowed unless requested by the instructor.
  3. All written assignments should be prepared in a manner that is neat and error-free. This assumes you have proofread your work for grammar, spelling, punctuation, and sentence construction. Points will be taken off for neglect in these areas.
  4. All assignments must be typed. Facilities are available to students on campus for this purpose. A cover sheet or heading at the beginning of the assignment should be used to identify your name, date, and the title of the assignment. Your name should appear at the top of all subsequent pages. Papers with multiple copies must be stapled.

### **5. Binder (15 points)**

➤ The binder (any size) will include section/dividers for the following:

- 1) Fitness to Teach Policy
- 2) Bloom's Taxonomy/Lesson Plan Information
- 3) Community Observation
- 4) Math Notes
- 5) Science Notes
- 6) Quizzes
- 7) Activities
- 8) Reflections
- 9) Assignments
- 10) Math/Science Literature List

The purpose of the binder is to begin establishing organizational management of paperwork. As educators, managing paperwork is key for effective time management.

### **(2) Quizzes (3 at 5 points-15 points)**

Three open book quizzes will be administered in class.

### **(3) Lessons and Reflections (3 at 50 points---150 points)**

Under the supervision of the cooperating teacher, the student will plan and teach one Science lesson, one Math lesson and one integrated Science/Math lesson . Lessons will be planned for one **large** instruction. If the CT is absent, on student's day to teach lesson, the lesson must be rescheduled. The lesson plans will follow a specific format provided in class. Note the turn in dates on attendance card that lesson plans were submitted.

**Lesson plans are first discussed with the cooperating teacher prior to teaching the lesson, secondly, submit to instructor through WebCT for feedback and lastly, the lesson is taught. Students will need to follow the tentative lesson plan timeline of every two weeks. The two weeks includes preparing lesson meeting with CT, teaching lesson and submitting lesson. Every two weeks a lesson plan should be taught. Turning in all three lesson plans at the end of the semester will not be accepted and will reflect in a lower grade. Lesson plans need to be evenly spread out throughout the semester. If there is a teaching scheduling conflict, let me know and I will discuss it with your CT.**

After the lesson has been taught, turn in lesson plan folder. The folder needs three items: 1) the taught lesson plan, 2) CT evaluation and 3) lesson plan reflection. It is encouraged to submit a student sample from the taught lesson plan. The graded lesson plans stay in folder throughout the semester. This is to see lesson plan growth. Post on WebCT, lessons that have been taught to serve as teaching resources.

Completed grand log hour sheets also go in the right pocket. A combined grand log sheet will be used for both the reading and math/science field experience. Using a highlighter, highlight the math/science entries. This will make it easier when the instructors have to calculate the completed hours. The grand log sheet will be provided on WebCT.

### **(4) Examination/Critique of Curriculum Materials (35 points)**

Four students per group will analyze and critique a range of EC-4 science and mathematics curriculum materials to include state-adopted textbooks, software, trade books, and supplementary texts. All curriculum materials are located at the 1604 campus library, 2<sup>nd</sup> floor in the multimedia room.

**(5) Science Chapter Presentations (20 points)**

A group of four students will present a science chapter section in Carin textbook. The 15-20 minute presentations will include a powerpoint and questions to formulate a peer dialogue. The week before class, post the dialogue questions on WebCT. The responses will be brought to class as part of the peer dialogue. Each group will meet with the instructor for preparing the designated chapter section.

**(6) Teacher Competencies (10 points)**

The teacher competencies will be provided on WebCT and to be created in a log form. Teacher competency samples will be demonstrated. For every teacher competency observed, document the date and a one brief teaching description. Begin to document teacher competencies upon the first day of field based observations.

**(7) Web Quest Projects (100 points)**

**Project 1 Webquest Evaluation 30 points:** In groups of four, students will examine and evaluate several online webquests. The evaluation webquest will assist elementary students in identifying the criteria of an interactive webquest. The webquest evaluation will be presented as a brochure, in a group panel format.

**Project 2 Math/Science Community Webquest Design**

**Community Observation 20 points:** The school's community will be explored in a data collection assignment. In the community observation, photos will be taken and integrated with the Web Quest design.

**Webquest Design 50 points:** The project will require students to work as a group and **design** their own community webquest that integrates math and science. (Tues class will be assigned by school). In the designing, photographs and data from the community observation will be implemented. The focus will be an exploratory question that is supported by three tasks. To complete the tasks, three internet research activities are needed. The webquest will be presented in a power point presentation that will be turned in, along with the technology. After completion of the community webquest, post it on WebCT.

**OTHER ASSIGNMENTS**

As the course unfolds, assignments related to the course may be required at the discretion of the instructor that clarify, support, or provide concrete experiences.

**Project Wild training** will be provided for one class lecture day during the week of Mar. 3-6 at Eisenhower Park. Times of the workshops will be 9:00 am - 4:00 pm. **Arrival time is 8:45.** This training is a required component of the math/sciences approaches course. It is a requirement to attend for the full day, regardless if you have taken a previous project wild workshop at another site. Being tardy or absent, will require make up time on another workshop day, After the make up time is fulfilled, certification and curriculum guidebooks will be provided. Saturday class will attend on designated field day (Wed or Thurs).

Dress appropriately for the weather...all activities will be outdoors in a covered pavilion. Bring plenty of water (no vending machines available). No flip flops as we will be hiking the park trails. Lunch will be 30 minutes, so bring a sack lunch (nearest food location is over 2 miles away) and any snacks for the day. Leaving the park for lunch is not permitted. Bring camera to take pictures during the hike.

Eisenhower Park is located 2 miles north of Loop 1604 on Military Road. Refer to [www.mapquest.com](http://www.mapquest.com) for directions from your residence to Eisenhower Park. The road actually goes into Camp Bullis. Right before the Camp Bullis gate is the park on the west side of the road. The workshops will be in the large pavilion on the right side of the parking lot.

## SPECIAL EVENTS

Jan. 30 7:00 pm Retama Room Barbara Bash, well known children's author and illustrator, especially in the area of science and ecology.

Feb. 7 7:00 pm Hailey Summerfield, Ft. Worth Dept. of Env. Quality, who trained with Al Gore, will present the science behind the "Inconvenient Truth". There will be a showing of the video prior to her presentation that evening

Feb. 16 9-4 WATT Watchers of Texas, energy conservation workshop for teachers, presented by the Energy Center of UTEP.

Mar. 3-6 9-4 Project WILD workshops at Eisenhower Park

## GRADING

Attendance, Participation, Professionalism.....	30
Binder .....	15
Quizzes.....3 at 5 points	15
Three Lessons and Reflections (40 each lesson, 10 each reflections).....	50/150
Examination and Critique of Materials and Technology .....	35
Science Chapter Presentations.....	100
Project 1: Web Quest Evaluation.....	30
Project 2: School Community Ethnography.....	20
Math/Science Community Web Quest Design.....	50

<b>Total points=</b>	<b>365</b>
<b>365-345</b>	<b>=A</b>
<b>344-324</b>	<b>=B</b>
<b>323-303</b>	<b>=C</b>
<b>302-282</b>	<b>=D</b>
<b>281 and below</b>	<b>=F</b>

## POLICES AND PROCEDURES

A UTSA Id must be worn at all times during field based experiences. If a UTSA id is not available, go to the school office and receive a visitor's pass.

Students are expected to demonstrate professional conduct and attire during lecture sessions. In order to minimize distractions, students will not leave the room during class unless an emergency arises. We will have a ten-minute break during each class session. **Only during the break, take care of phone calls not during class time.**

**During lectures, students will refrain from engaging in individual conversations, using cell phones and text messaging or professionalism points will be reduced and a Fitness to Teach Policy will be implemented.** If the cell phone needs to be on, let the instructor know of the circumstance.

No electronic recording of lectures or class sessions may be used without the prior permission of the instructor.

UTSA Honor Code: “On my honor, as a student at the University of Texas at San Antonio, I will uphold the highest standards of academic integrity and personal accountability for the advancement of the dignity and the reputation of our university and myself.”

### **SCHOLASTIC DISHONESTY**

Students are expected to be above reproach in scholastic activities. Students who violate rules pertaining to scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and dismissal from the University. According to The Regents’ Rules and Relations, Part One, Chapter VI, Section 3, Subsection 3.2, Subdivision 3.22, “Scholastic dishonesty includes, but is not limited to, cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an exam for another person, and acts designed to give unfair advantage to a student or the attempt to commit such acts.” Since scholastic dishonesty harms the individual, all students, and the integrity of the University, any incidence of student dishonesty will be promptly addressed as outlined in the HOP.

Special note on plagiarism: Any breach of academic integrity will be dealt with seriously. According to Section 203 (D) of the Code of Student Conduct: "Plagiarism" includes, but is not limited to, the appropriation, buying, receiving as a gift, or obtaining by any means another's work and the submission of it as one's own academic work offered for credit. If you utilize any sources on the internet for assignments, please be sure to cite these appropriately.

### **SUPPORT SERVICES**

Students with disabilities must be registered with the Office of Disability Services (MS 2.03.18, telephone 458-4157) 458-4981 TTY or Downtown FS 1.526, 458-2816, in order to receive support services and/or special accommodations

### **TEXAS EDUCATOR STANDARDS (see next page)**

Familiarize yourself with the below specific standards.

<http://www.sbec.state.tx.us/SBECOnline/standardtest/edstancertfieldlevl/asp>.

<b>Science Standards</b>	<b>Mathematics Standards</b>	<b>Technology Standards</b>	<b>Diversity Standards</b>
<p>Standard I: 1.2k, 1.4k; 1.1s, 1.6s</p> <p>Standard II: 2.2k, 2.4k, 2.5k, 2.6k; 2.1s, 2.2s, 2.6s, 2.8s, 2.9s, 2.10s</p> <p>Standard III: 3.2k, 3.5k; 3.1s, 3.2s, 3.3s, 3.4s, 3.6s, 3.7s, 3.8s</p> <p>Standard IV: 4.3k, 4.4k, 4.8k, 4.13k; 4.1s, 4.3s, 4.10s, 4.11s, 4.12s</p> <p>Standard V: 5.3k, 5.4k, 5.8k; 5.1s, 5.3s</p> <p>Standard VI: 6.2k, 6.9k, 6.10k; 6.2s, 6.6s</p> <p>Standard VII: 7.3k, 7.4k, 7.5k; 7.4s</p> <p>Standard VIII: 8.1k, 8.2k, 8.3, 8.4k; 8.1s, 8.3s, 8.4s, 8.8s, 8.9s</p> <p>Standard IX: 9.1k, 9.2k, 9.3k, 9.4k, 9.5k, 9.6k; 9.1s, 9.2s, 9.3s, 9.4s, 9.5s, 9.6s, 9.7s, 9.8s, 9.9s</p> <p>Standard X: 10.1k, 10.2k, 10.3k, 10.6k, 10.7k; 10.1s, 10.2s, 10.3s, 10.4s, 10.5s, 10.7s, 10.8s</p> <p>Standard XI: 11.1k, 11.3k, 11.5k; 11.1s</p>	<p>Standard I: 1.1s, 1.2s, 1.4s, 1.5s, 1.8s, 1.11s, 1.12s</p> <p>Standard II: 2.1s, 2.2s, 2.4s, 2.7s</p> <p>Standard III: 3.1s, 3.2s, 3.3s, 3.4s, 3.5s, 3.6s</p> <p>Standard IV: 4.1s, 4.2s, 4.6s, 4.7s</p> <p>Standard V: 5.2k, 5.3k, 5.5k, 5.6k, 5.7k; 5.1s, 5.4s, 5.7s, 5.8s, 5.9s, 5.13s, 5.18s, 5.20s, 5.22s</p> <p>Standard VI: 6.2k, 6.3k, 6.5k; 6.1s, 6.2s, 6.4s, 6.5s, 6.6s</p> <p>Standard VII: 7.1k, 7.2k, 7.3k, 7.7k, 7.9k, 7.10k, 7.14k, 7.15k, 7.16k; 7.1s, 7.2s, 7.3s, 7.6s, 7.7s, 7.8s, 7.11s, 7.14s, 7.19s, 7.20s, 7.21s</p> <p>Standard VIII: 8.1k, 8.5k; 8.1s, 8.3s</p> <p>Standard IX: 9.3s</p>	<p>Standard I: 1.1k, 1.2k; 1.3s, 1.6s, 1.8s, 1.10s</p> <p>Standard II: 2.1k, 2.2k, 2.3k; 2.1, 2.3s, 2.8s</p> <p>Standard III: 3.1k, 3.2k; 3.1s, 3.2s, 3.10s, 3.14s</p> <p>Standard IV: 4.1k, 4.2k, 4.3k; 4.1s, 4.4s, 4.6s, 4.7s, 4.10s, 4.12s</p> <p>Standard V: 5.2k, 5.3k, 5.7k; 5.1s, 5.2s, 5.3s, 5.4s, 5.7s, 5.8s, 5.9s, 5.14s, 5.15s, 5.16s</p>	<p>Under Pedagogy &amp; Professional Responsibilities: 1.5k, 1.5s; 2.1k; 3.3k, 3.3s; 4.1s</p> <p>Under Science: 4.11s; 6.2k, 6.9k, 6.6s</p> <p>Under Mathematics: 6.2k, 6.2s, 6.5s; 7.2k, 7.3s, 7.21s</p> <p>Under Technology: 5.2s</p>

