



**EED 435 SCIENCE INSTRUCTION IN THE ELEMENTARY/MIDDLE SCHOOL**  
*Course Number is a required course for EC-6 and 4-8 Certification.*  
**College of Education**  
**Department of Curriculum & Instruction**

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MW 2-5 or by appointment

**Text/Readings:** *(No textbook is required for this course)*

*Project Learning Tree* (11<sup>th</sup> edition) America Forest Foundation. Available at a later date from professor. Cost will be available later. This will be provided for you FREE! You must attend the workshop to receive the book.

Science TEKS Charts – Available from your professor or purchase online from Region IV @ <http://www.region4store.com/>

**Welcome to an exciting field-based methods course in science education!**

“Except for children (who don’t know enough not to ask the important questions), few of us spend much time wondering about why nature is the way it is; where the cosmos came from, or whether it was always here; if time will one day flow backward and effects precede causes; or whether there are ultimate limits to what humans can know. In our society it is still customary for parents and teachers to answer most of these questions with a shrug.” Carl Sagan, in S. W. Hawking, *A Brief History of Time* (New York: Bantam Books, 1981, p. ix).

**Course Description:**

This unique classroom and field-based experience is designed to acquaint the *prospective* elementary teacher with a variety of instructional principles and practices for engaging children in the learning of relevant science concepts and skills. This course is intended to help teacher candidates develop the knowledge, attitudes, and skills required for you, as a new teacher, to effectively nurture children's curiosity and guide them in exploring and learning about the fascinating world around them.

The nature of science as a discipline and the scope and sequence of appropriate content for each grade level will be explored. Active involvement in class projects and assignments will enable teacher candidates to develop an understanding of curriculum, instructional methods and

materials, and evaluation techniques for elementary science based upon educational research, contemporary practice, and state and national standards for science education. Teacher candidates will have opportunities to demonstrate your knowledge, attitudes, and skills both in class with your peers and with elementary students during your field placement. Personal reflection on class experiences and learning is an expected component of your participation in this course.

The intent of this course is to immerse teacher candidates in the culture and context of the elementary/middle school with the idea that both confidence and competence in science teaching is key. The role of the teacher candidate throughout this experience is that of a learner and a teacher. The teacher candidate works collaboratively with practicing EC-4 or 4-8 teachers in field based settings.

### **COURSE PHILOSOPHY & CONCEPTUAL FRAMEWORK**

Committed to the college's "Conceptual Framework for Teacher Preparation" because of its far-reaching effects in promoting science literacy. The desired attitudes, knowledge, and skills that form the objectives of its courses are best developed through extensive interactions among faculty, preservice teachers, practicing teachers, administrators, colleagues, business/industry personnel, scientists, curators of museum, and governmental agents. Students are made aware of this collaboration by living it and reflecting on its worth in enhancing their learning and the role they should play as Science Education leaders.

#### **Standards Matrix:**

<b>Objectives/ Learning Outcomes</b>	<b>Activities (* indicates field-based activity)</b>	<b>Performance Assessment</b>	<b>Standards: State Standards PPR NAEYC NSTA/NSES</b>
The EC-6 & 4-8 science teacher explores the history and nature of science and identifies the role of science in contemporary classrooms.	<p>Complete a Science Survey (See Science Survey)</p> <p>Create a Science Journal with a "Science in my World" themed cover</p> <p>Explore the journey of science education today via PowerPoint.</p> <p>Construct a set of science-eyes and reflect: <i>What are science eyes and why should elementary teachers have them?</i></p>	<p>See Journal Peer Review Rubric</p> <p>Reflection Rubric</p>	<p>ECE: 020</p> <p>PPR: 2, 3,7,8,10,13</p> <p>NAEYC: 5</p> <p>NSTA/ NSES: IV</p>

<p>The EC-6 &amp; 4-8 science teacher manages classroom, field, and laboratory activities to ensure the safety of all students.</p>	<p>*Teach a hands-on Science Lesson</p>	<p>See Lesson Plan Rubric</p>	<p>ECE: 020 PPR: 6 NSTA/NSES: I</p>
<p>The EC-6 &amp; 4-8 science teacher uses the correct tools, materials, equipment, and technologies.</p>	<p>*Teach a Science Lesson EC-6/4-8  Participate in a Metric Olympics competition (Activities that Integrate Mathematics and Science – AIMS) and write a reflection that addresses the prompt: <i>Why do children need to learn and use the metric system in science?</i></p>	<p>See Lesson Plan Rubric  See Reflection Rubric</p>	<p>ECE: 020 PPR: 5, 6 NSTA/NSES: III</p>
<p>The EC-6 &amp; 4-8 science teacher describes the processes of scientific inquiry and explains the role of inquiry in science instruction.</p>	<p>Conduct an egg-in-the-bottle inquiry.  Complete a sea shell process skill lab activity and write a reflection from the point of view of their sea shell. Students use the processes skills of science as they investigate sea shells.  Identify three types of hands-on activities: guided, challenge &amp; inquiry and participate in an exploration of foam. See: <a href="http://www.exploratorium.com">http://www.exploratorium.com</a></p>	<p>See reflection rubrics</p>	<p>ECE: 020; 021 PPR: 3, NSTA/NSES: III</p>
<p>The EC-6 &amp; 4-8 science teacher has theoretical and practical knowledge about teaching science and about how students learn</p>	<p>FOSS Kits – Full Option Science Systems FOSS and read “The Biological Basis of Thinking and Learning” by Lawrence Lowery</p>		<p>ECE: 020 PPR: 1, 3, 4 NSTA/NSES: IV</p>

science.			
The EC-6 & 4-8 science teacher develops varied and appropriate assessment practices to monitor science learning.	Great Performances Power Point Creating Classroom-based assessment tasks Cookie Rubric Activity Creating a Unit Performance Assessment	See unit rubric	ECE: 020 PPR: 3, 4 NSTA/NSES: V
The EC-6 & 4-8 science teacher understands how science affects the daily lives of students and how science interacts with and influences personal and societal decisions.	*Write a Science-eyed Case Study Field Paper that identifies and describes science in the elementary and middle school  Students conduct a long-term observation of Moon Phases and write a grade-level appropriate lesson plan for moon phases.  Project Learning Tree Professional Development	See science-eyed case study rubric  See Moon Phases Rubric  Reflection rubric	ECE: 020; 021 PPR: 3, 5, 10 NSTA/NSES: VII; X
The EC-6 & 4-8 science teacher knows and understands the science content appropriate to teach the statewide curriculum (TEKS) in physical science.	Students explore physics and simple machines by creating a bobble head  Student identify state of matter and rewrite an ice-cream activity using the Five-E instructional model.  Student map the states of matter TEKS strand K-8 and then reflect on <i>how elementary science programs are like and ice-cream cone.</i>	See Bobble Head Rubric  Reflection rubric	ECE: 020; 021 PPR: 6, 8, 9, 10 NSTA/NSES: VIII
The EC-6 & 4-8 science teacher identifies the science content appropriate to teach the statewide curriculum	Students are introduced to the unit development process through a classic “Fishy Business” unit.  Students explore the interdependence of living things and symbiosis through a “Fishy Feeding Frenzy” activity.	See unit rubric	ECE: 020; 022 PPR: 6, 8, 9, 10 NSTA/NSES: IX

(TEKS) in life science.	Students explore the external anatomy (structure/function of fish) through Fish Printing – Gyotaku		
The EC-6 & 4-8 science teacher knows and understands the science content appropriate to teach the statewide curriculum (TEKS) in Earth science.	Students conduct a long term observational moon phase study.  Develop an integrated thematic science unit centered on one of four themes:  <ol style="list-style-type: none"> <li>1. Nature of science</li> <li>2. Properties, patterns, and models</li> <li>3. Constancy and change</li> <li>4. Systems</li> </ol>	See unit rubric	ECE: 020; 023 PPR: 6, 8, 9, 10 NSTA/NSES: 023
The EC-6 & 4-8 science teacher can identify unifying concepts and processes that are common to all sciences.	Develop an integrated thematic science unit centered on one of four themes:  Nature of science Properties, patterns, and models Constancy and change Systems	See unit rubric	ECE: 020; 021; 022; 023 PPR: 6, 8, 9, 10 NSTA/NSES: VII, IX, X

National Research Council. (1995). *The National Science Education Standards*. National Academy Press, Washington, DC. <http://www.nsta.org/publications/nse.aspx>

Web address for state standards: <http://tea.state.tx>

Web address for specialty organization standards: [www.nsta.org](http://www.nsta.org)

### Course Format:

During the 3 hour course, students will be involved in lecture or narrative presentations, small group discussions, virtual classroom visits through videotaped case studies, hands-on science activities (individual, paired, cooperative groups), inquiry activities, peer teaching, review of instructional resources, reflective journaling, lesson planning, supplemental professional development opportunities, etc. The field component of the course involves 154 hours with one or more mentor teachers at an assigned public school campus at a grade level corresponding with student's certification goals. **Students will teach a minimum of 2 science lessons to students in their field based placement.** Special professional development activities as well as TExES reviews and qualifying exams will be scheduled throughout the semester.

**Course Content: [See attached calendar of activities]****Evaluation (\* indicates field-based activity):****GRADING POLICY**

(NOTE: A minimum of 50% of the grade for this class is based on field experience related activities. Please check your Common Syllabus for this information)

The correlation between total points and letter grades for the course appears below:

**A** = 540 – 600 points (90% and above)

**B** = 480 – 539.9 points (80% to 89%)

**C** = 420 – 479.9 points (70% to 79%)

**F** = 419 or Below

Please Note: Students receiving a grade less than "C" either cumulatively or in field-based activities, will either not be recommended for student teaching or will be offered a professional growth plan that must be completed during student teaching.

<b>Activity/Project</b>	<b>Point Value</b>
Science Journal	50
Science TWS Unit	50
Unit Presentation	50
Reflections (10 pts each)	100
Moon Phase Project	50
*Science-Eyed Field Paper	100
*Science Lesson Plan/Teach	50
*Field-based Points	150
Total Points Possible	600

\*Denotes Field-based Activity

**Expectations:**

- Complete assigned reading prior to discussion of topics in class.
- Actively participate in all class activities and discussion.
- Turn in assignments and be prepared for presentations on the due date.
- Access the Internet and skills to use it.
- Check your e-mail and Blackboard for the course daily.
- Use a word processor to complete written assignments unless instructed otherwise. Use an easy to read font, no smaller than 12 point. Remember to use spell-check and grammar-check features and proof-read your work.
- Ask questions if you are confused.
- Talk to your instructor if something is bothering you.
- Learn as much as you can.
- Have fun.

**Disability Statement:**

Students with a disability that affects their academic performance are expected to arrange for a conference with the instructor in order that appropriate strategies can be considered to ensure that participation and achievement opportunities are not impaired. The physically impaired may contact the Director of the Counseling Center as chair of the Committee for Continuing Assistance for Disabled Students by telephone (extension 1720).

### **Bibliography:**

#### *Suggested Readings:*

American Association for the Advancement of Science. (1993). *Benchmarks for science literacy*. New York. Oxford University Press. ISBN #0-19-58986.

<http://www.project2061.org/publications/sfaa/default.htm>

Carin, A., Bass, J., & Contant, T (2004). *Teaching Science as Inquiry* (10<sup>th</sup> edition). Merrill Prentice Hall, ISBN 0-13-118165-3.

National Science Teachers Association. (1997). *Pathways to the standards: Elementary school edition*. Lowery, L. (Ed.) NSTA. ISBN #0-87355-161.

Ostlund, K., & Mercier, S. (1996). *Rising to the challenge of the National Science Education Standards: The processes of science inquiry*. Primary or Elementary Edition. S&K Associates.<sup>1</sup>

[http://www.sciencesbookreview.com/Rising\\_to\\_the\\_Challenge\\_of\\_the\\_National\\_Science\\_Education\\_Standards\\_The\\_Processes\\_of\\_Science\\_Inquiry\\_0965876802.html](http://www.sciencesbookreview.com/Rising_to_the_Challenge_of_the_National_Science_Education_Standards_The_Processes_of_Science_Inquiry_0965876802.html)

Nath, J. & Ramsey, J. (2004). *Preparing for the Texas PreK-4 Teacher Certification: A guide to the comprehensive TExES content areas exam*. Pearson Education, Inc.

National Research Council. (1996). National science education standards. NSTA.

<http://www.nap.edu/readingroom/books/NSTA/NSES/html/>

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