

**University of Texas – El Paso**  
**College of Education**  
**Department of Teacher Education**

**BED/ELED 4311: Teaching Science in the Elementary School/Teaching Science in  
the Dual Language Classroom (CRN: 22365 & 23604)**  
**Spring 2014**

**Contact Information**

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UTEP Department of Teacher Education

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Office hours: Tuesday 12:00 – 2:30 PM & Thursday 2:00 PM – 4:30 PM.

If you would like to come to my office at a different time,  
please email me to set up an appointment.

I will try to answer Blackboard emails and messages within the first two days of  
receiving them (Monday-Friday). E-mails received after 5:00 PM Friday will be  
answered by Monday.

**Course Description:**

Number: BED/ELED 4311 Teaching Science in the Elementary School/Teaching Science in the  
Dual Language Classroom (3.0 S.H.)  
Time: Thursday 5:30 PM – 8:20 PM  
Location: Education Building Room 405

**Purpose:**

This course will assist you in critically examining the theories, research, pedagogical techniques, and materials associated with effective learning and teaching in an elementary science classroom. The overarching goal of the course is to expose you to the knowledge and skills needed to design and implement a science learning environment where every student is held to high expectations and achieves maximum learning. Some of the content of this course has been influenced by the National Science Education Standards (NSES) understanding of scientific inquiry and the New Generation Science Standards (NGSS). During the formal teaching activity, you will be using concepts from Standards I, III, VI, and V of the Pedagogy and Professional Responsibilities Standards (PPR) with particular emphasis on constructing and implementing instructional strategies, informal and formal assessment, and managing the learning environment. The class is also designed to address the following science standards from the K-4 Comprehensive Standards:

*Standard I:* The science teacher manages classroom field, and laboratory activities to ensure the safety of all students and the ethical care and treatment of organisms and specimens.

*Standard III:* The science teacher understands the process of scientific inquiry and its role in science instruction.

*Standard IV:* The science teacher has theoretical and practical knowledge about teaching science and about how students learn.

*Standard V:* The science teacher knows the varied and appropriate assessments and assessment practices to monitor science learning.

## Guiding Principles for this Course

This course is organized around the community of practice and service learning principles and strands (Michaels, Shouse, & Schweingruber, 2008):

**Principle 1—Community of Practice:** is a concept that depicts how people work together for their common interests and learn from each other's expertise to develop themselves personally and professionally. To form a community of practice in this course, students are provided with various opportunities to communicate their opinions, share their learning, and help each other improve. In particular, the science lesson project is designed as a common goal that drives students to prepare themselves, help each other, and collaborate to achieve by the group.

**Principle 2—Service Learning:** is a teaching method that aims to enrich learning experiences and strengthen communities through services. This course includes one activity for students to contribute what they learn in this course to El Paso communities (e.g., elementary students).

**Principle 3—The New Generation Science Standards (NGSS).** The NGSS recognizes the necessity for engagement in science and engineering practices as an effective means for understanding of core ideas. Additionally, the NGSS emphasizes connecting explanations supported by evidence. The abstract nature of scientific ideas puts all students, including English learners, in a position that requires them to go beyond the understanding of vocabulary words. The emphasis is now on what students can do in terms of using scientific practices to engage in learning and using science language to communicate their understanding. This strand will be addressed through hands- and minds-on activities from the *Engineering is Elementary (EiE)* curriculum.

**Strand 1—Understanding scientific explanations** (Knowledge about nature, links among major scientific topics). This strand will be addressed in the scientific inquiry, observational and experimental topics. Besides learning scientific information proficient science learners know, use, and interpret scientific explanations of the natural world. For instance, rather than memorizing facts students should be able to apply their knowledge in a different learning scenario.

**Strand 2—Reflecting on scientific knowledge** (Understanding how scientific knowledge is constructed). This strand will be addressed in the Nature of Science (NOS) topics. Proficient science learners understand that predictions and explanations can be revised on the basis of learning new facts, generating new evidence. For instance, students learn what it feels like to do science as well as what the game of science is all about.

**Strand 3—Participating productively in society** (Understanding how to present scientific evidence and interact with peers and learners). In concomitance with principle #2 above, this strand will be addressed while you teach a scientific inquiry lesson to a group of elementary students. Proficient science learners know how to effectively present scientific evidence to their peers in the context of a classroom science investigation. For instance, students like scientists, should be able to benefit from sharing ideas with peers, interpreting data, and in group deciding which claims are most valid.

**Resources:** There is no book for this course. There will be numerous handouts, class notes on lectures, discussions and presentations. I will make articles and other materials available throughout the course as needed. There is also a Blackboard platform to which you will be automatically connected by being registered for this course. The Blackboard tool is intended to be a supplement to

this course; there you will be able to access, quizzes, assigned readings and other important resources you may want to review on your own.

Other materials we will be using:

- Texas Essential Knowledge and Skills (TEKS)  
<http://www.tea.state.tx.us/index2.aspx?id=6148>
- English Language Proficiency Standards (ELPS)  
<http://ritter.tea.state.tx.us/rules/tac/chapter074/ch074a.html#74.4>
- The National Science Education Standards (NSES)  
[http://www.nap.edu/openbook.php?record\\_id=4962](http://www.nap.edu/openbook.php?record_id=4962)
- The New Generation Science Standards (NGSS)  
[www.nextgenscience.org/next-generation-science-standards](http://www.nextgenscience.org/next-generation-science-standards).

### Technology Requirements

- Each participant must be able to use their UTEP Blackboard account. You MUST have both a UTEP email address and password to take this course.
- You must have access to UTEP email and Blackboard prior to the beginning of the second class meeting. If you do not have one yet, you may apply for your UTEP email account, login, and password from a form available online at: <https://newaccount.utep.edu>

**Technical Assistance:** The University of Texas at El Paso offers complete technical information and help desk support at: <http://issweb.utep.edu/techsupport/>.

**Professional Expectations of Students:** Part of your preparation as a teacher includes following a professional code of behavior and responsibility. Therefore, you are expected to treat all members of the class and your instructor with respect. Consider each class as *a meeting with colleagues in your field* and a great opportunity to exchange ideas. Attending class meetings on time and remaining for the entire scheduled period, being well prepared, and participating in classroom discussions are key parts of professional behavior. It is your responsibility to:

- Examine the Blackboard platform for this class, and inform your instructor by the second class meeting if you run into difficulties interacting in this environment.
- Read all the class materials thoroughly and continually consult the course schedule in order to keep up on all information associated with this class.
- Participate fully in all class activities and collaborate closely with your teammates.
- Be actively present in class; stay focused on the learning activities.
- Submit ALL your course assignments via Blackboard in the prescribed format.
- Be courteous and honest in communicating with others that shows respect and sensitivity to cultural, religious, sexual, and other individual differences among all class members.
- Provide constructive feedback that helps your teammates, class members, and the instructor improve their performance, and appreciate it when they provide you with the same.
- Use the assignment templates in the preparation and submission of your assignments. If you do not follow the directions presented in the templates you will loss points.
- **Turn off your cell phone** before starting the class meeting. As stated above, each class is a meeting with colleagues in your field. Professionals turn off their phones in a meeting with other professionals. A ringing phone disrupts because the sound of a phone attracts attention. Disruptions of the learning process are annoying.
- **Laptops in class:** I do not mind you using your laptop in class, except when it disrupts the learning process. These activities show a lack of respect for your teammates and instructor and disinterest in the course that is unprofessional and not acceptable.

- *Be persistent.* If you run into difficulties, do not wait! Contact your instructor (see Contact Information above), or check with one of your classmates through Blackboard email. Most problems are easily solved but we have to hear from you before we can help.
- Inform the instructor if you are going to be absent so that you can get an update on what you missed (i.e., assignments). If you miss class consult the PowerPoint presentation in the Content area of Blackboard.
- Be aware of your absences. Students who are late to the class will be counted as absent for the first half of the class. It is the student's responsibility to call attention to their presence in the class (and sign the attendance sheet) if they come in after the attendance is taken.
- Inform your instructor as soon as possible if you have problems submitting your assignments on Blackboard. If the system does not allow you to turn in the assignment, you must send it via email to your instruction before the due date. Assignments submitted after the due date will not be graded for full credit—see Assignment submission policy on page 8.

**Students Expectations of Instructor:** You can expect me to be on time, prompt with assignments and feedback, knowledgeable in the topics being covered; create and provide opportunities for you to practice fundamental pedagogical content, and to bring in experts in the areas to augment my background either where needed or simply advantageous. To the best of my ability, I will treat all students equally, fairly, pleasantly, and be readily available for help outside class time.

**Student Learning Outcomes:** It is expected that by the end of the course, the successful student will be able to:

1. Identify the value of inquiry as an instructional strategy.
2. Develop the ability to assist elementary school students in designing investigations using scientific inquiry.
3. Outline strategies for modifying content area lessons to accommodate English Language Learners (ELLs) according to guiding principles in learning theories like those in the Socio-Transformative-Constructivism (sTc) theory.
4. Understand and address the role of underrepresented groups in the science curriculum.
5. Identify and implement quality science curriculum materials like the EiE curriculum into instructional activities relevant to elementary education learning settings.
6. Demonstrate and understand the implementation of different instructional strategies and teaching materials consistent with the goals of the National Science Education Standards (NSES), the applicable Texas Essential Knowledge and Skills (TEKS), and the newly released New Generation Science Standards (NGSS).
7. Develop a well-thought-out, research-based, philosophy of science teaching.
8. Demonstrate proficiency in the use of the 5E Learning Cycle as a model for lesson planning that supports the teaching and learning of basic and integrated inquiry process skills.
9. Design science lesson plans that include interdisciplinary connections.
10. Perform an analysis of effective and teaching methods [embedded in lesson plans] for teaching elementary science.

### Assessment of Student Learning Outcomes

Assignment	Assessment of learning outcomes
1. Quizzes	Learning outcomes: 1, 3, and 6
2. Lesson plan	Learning outcomes: 2, 3, 4, 5, and 6
3. Growth essays	Learning outcomes: 1 4, 6, and 7
4. Final exam	Learning outcomes: 1, 2, 3, 4, 5, 6, and 7
5. Reflections	Learning outcomes: 1, 2, 5, 6, and 8
6. Activities	Learning outcomes: 1, 2, 3, 4, 5, 9, and 10

## Grading Criteria

The course will be assessed based on the following criteria:

Assignment	Percentage of Grade
1. Quizzes (4 announced and 3 unannounced) (55 pts) (IA)	10%
2. 5E Lesson plan (1 @ 100 points) (GA) (20%)	20%
3. Growth Essays(IA) - Essay 1: Autobiography as a learner (5 points -2.0%) - Essay 2: Philosophy statement draft 1 <u>for peer review</u> (5 points - 3.0%) - Essay 3: Philosophy statement final draft (5 points - 5%)	10%
4. Final exam—online test (50 points) (IA)	25%
5. Activities* (5 points each). <ul style="list-style-type: none"> <li>• Activity 1: My views about science education concept map (IA)</li> <li>• Activity 2: Basic inquiry skills: Bread on the Rise (GA)</li> <li>• Activity 3: Review of a 5E lesson sample (GA)</li> <li>• Activity 4: Art and science grow together: Communicating through art</li> <li>• Activity 5: Scientific misconceptions (IA)</li> <li>• Activity 6: Inquiry investigations with plants (I) (GA)</li> <li>• Activity 7: Outlining a 5E lesson plan (GA)</li> <li>• Activity 8: Inquiry investigations with plants (II) (GA)</li> <li>• Activity 9: Lesson peer review (IA)</li> <li>• Activity 10: Inquiry investigation with plants (III) (GA)</li> <li>• Activity 11: Art and science project approval (GA)</li> <li>• Activity 12: Understanding the NSES, TEKS, and the NGSS (GA) <i>The instructor will model this activity in class on Jan. 31.</i></li> </ul>	30%
6. Reflections (2 @ 5 points each) (IA)	5%

IA: Individual Assignment; GA: Group Assignment

*\*In the case of the 'in-class' activities, students must be present throughout the entire class meeting to earn these points.*

## Grades

Overall grading will be A-F, points weighted by percentages. All work is expected to be clearly written (and word-processed), reflect thoughtful response to the assignment guidelines, and be of high quality.

A = 90-100%

D = 60-69.9%

B = 80-89.9%

F = BELOW 60%

C = 70-79.9%

**Description of the Assignments:** Below you will find a description of each assignment for this course. Please do not hesitate to consult with me if you have any questions.

- 1. Four announced online quizzes (5%) (IA):** All online quizzes cover the assigned readings to date, and are due by the posted time on the deadline date (See course calendar). The format of the quizzes may include true and false, multiple choice, and short answer questions that you will need to answer completely with supporting evidence from the readings. Quizzes are also timed **(30 minutes)** so you should be sure to set yourself up in a quiet place to take this **in one attempt**. Be sure to **save your answers** after each response and finally submit the quiz when you have it completed. These quizzes include the syllabus quiz and are worth 10 points each.

*If you run into technical difficulties while completing and/or submitting your quiz, you will have to opportunity to finish the test in the instructor's office, in a paper-and-pencil format, and for the time you had left in your first attempt. In the case of completing the quiz in the paper-and-pencil format you will be provided with new questions.*

**Three unannounced in-class quizzes (5%) (IA):** These are short in-class (paper and pencil) quizzes that cover the assigned reading/s and your knowledge of it. These quizzes will consist of short answer questions and will take place at the beginning of class—be punctual! If you are not present at the time the quiz is administered, you will be allowed to take it for partial credit (75%) in the instructor's office within the next week only. In this case, contact your instructor confirming that you are taking the missed quiz. These quizzes are worth 5 points each.

## **2. Lesson plan (20%) (GA)**

Students work small groups (3-4 per group) to design a 5E lesson plan that addresses the applicable TEKS, the core ideas of the Socio-Transformative-Constructivist (sTc) learning theory, and the teaching and learning of the scientific language. Students are provided with a lesson template to fill out. The components should be written clearly in the lesson plan: (a) title and grade, (b) learning objectives, (c) Links to TEKS, (d) list of materials, and the phases of the 5E Learning Cycle (e) Engage, (f) Explore, (g) Explain, (h) Elaborate, (i) Evaluate, (j) vocabulary instruction, (k) resources/bibliography, and (l) supportive documents (i.e., activity guide, hand-out).

The 5E lesson plan (single-spaced, 2-3 pages long only plus supportive documents [i.e., activity guide]) are submitted through the BLACKBOARD system. Your instructor will assign each group another group's lesson for review (Activity 9).

## **3. Growth essays ([one] Autobiography and [two] Science Teaching Philosophy statements) (IA)**

### ***Essay 1: autobiography as a science learner\*\* (2.0%)***

Think back of your elementary or high school days and write a **1-page** (double-spaced) about your experiences as a learner in science classrooms. Do not forget to integrate this account into your science teaching philosophy statements. Consider these questions for your autobiography:

- Identify the subject and the teacher (tell the reader about her/him). Do any clear images come to mind?
- What did the teacher/students do? Be as specific as you can – include all the things that teachers did in your science lessons. Contrast the teachers you had for science, in terms of the kinds of opportunities they offered for you to learn.
- What did you and your peers do in science classes? Did you have opportunities to: interact with other students, do hands-on activities, carry out your own investigations, read the text aloud, work in small groups, work on your own, participate in whole class discussions?
- How did you feel in your science classes?
- What made you think you were/were not learning science? How did you determine you were learning or not?
- Do you remember feeling like you belonged to the community of people who could do science? Why or why not?
- When did you decide about your profession as an elementary teacher?

Feel free to include other aspects of your science learning experiences that I have not mentioned in the instructions.

\*\*See autobiography samples in Blackboard.

***Essays 2 & 3: Science Teaching Philosophy statements (first [3.0%] and final [5.0%])***

There are different reasons for having a “science teaching philosophy.” It gives you the chance to situate your science teaching and learning perspectives, revitalize your views and gain confidence to face your profession. It is also highly beneficial for you to have this statement to share with prospective employers as a competitive tool to set yourself above other candidates. You should begin your own philosophy of [science] teaching even before your placement in a field experience. Expect your thoughts about education to change as you learn and grow professionally. Allow this reflective exercise to show your growth within the profession across time and thus renew your dedication to the field of education. Research has shown that prospective teachers' personal histories with learning science (both positive and negative) have a great influence on how they teach science. Remember, **this is a science teaching philosophy statement, NOT a philosophy of education statement.**

In this 1 ½ page (double spaced) statements, you are expected to convey your views about the teaching and learning of science in elementary school classrooms. Make sure to: a) address briefly (one or two sentences only) your autobiography as a science learner/essay one, b) incorporate ideas, concepts, and principles discussed and practiced in class and c) in the final draft, address the comments and questions provided by your peers and the instructor in the first draft. Statements are cumulative or emergent, that is they evolve by addressing comments and suggestions from the instructor, and including new evidence and ideas from class topics, discussion, and activities.

Please note that **essay 2** (or first draft of your science teaching philosophy) will be submitted for a blind peer review exercise—the instructor will give each student a philosophy statement (essay 2) to review. You will earn the points by submitting on time your statement (3 pts) and for sending your review to the instructor (2 pts). Each student will receive feedback and comments on the essay 2. **Essay 3** (or final draft of your science teaching philosophy) will be reviewed and graded by the course instructor.

Ideas for your FIRST DRAFT: Remember this will change by the FINAL DRAFT this semester-be honest and humble if you're unsure at this point.

1. Your previous experiences as a science learner
2. Your goals, where you want to “go” professionally
3. Why you decided to enter the teaching profession
4. Your definition of teaching and learning in formal and informal settings
5. Your role in helping students achieve and develop
6. Your style and belief about effective teaching
7. How you wish to be remembered by students
8. Why you believe teaching is valuable
9. Recall someone who positively affected your school experiences
10. Your personal characteristics and strengths

\*\*See *Science Teaching Philosophy samples and rubric* in Blackboard.

4. **Final exam (25%) (IA):** This examination will cover readings, class notes, in-class activities, individual and group projects. Sample questions and format will be discussed in class and posted on the Blackboard prior to the midterm evaluation. Like in the case of the online quizzes, you need to

plan ahead so that you can complete this test in one attempt. *You are not allowed to log out and return to the test.*

#### 5. Reflections (5%)

Students are provided with a reflection template. The completed form should be submitted to the instructor through the BLACKBOARD system in time. Reflections will be focused on the art and science and group inquiry projects.

6. **Activities (30%).** These are both individual and group activities that will take place in class and outside the regular class time. In each class we will engage in activities that illustrate and document exemplary science learning/teaching strategies, and/or exemplify main ideas in the assigned readings.

*See each **activity** highlighted in the course calendar (page 10).*

### Academic Policies

#### Assignment Submission

Your assignments are expected to be submitted online (via Blackboard) using the assignment template on the scheduled day and time; submit them according to the prescribed format (e.g., written report). Late work will not be accepted for full credit unless you have evidence of extenuating circumstances. Unfortunately, sometimes less than excusable circumstances arise even for professionals in the field and you made need an extension. However, I will only agree to grade late work for the first week following a due date, deducting 25% off the total grade. No assignments will be accepted past one week late. Plan carefully to ensure you meet the deadlines. If you wait until the last minute, things that can go wrong often do. Your computer will crash, the internet connection stops working, etc. Please ask if you have questions or concerns about how to do any assignment in this course. You need to check your Blackboard email regularly for communications from your instructor. Once you submit your assignment *make sure it is posted.*

Assignments will be submitted in the Assignments area of navigation menu, and will need to be posted as Word files or as a PowerPoint (PPT) only (no rft. or Prezi formats please). When submitting a group assignment, your group will designate a member to be responsible for the submission of the project—this is part of the goals your group will set up in class. Please, include in each submission the names of the students [and their roles and responsibilities] who participated in and contributed to the preparation of the group project. Students who do not contribute to group projects will earn a grade of zero (0). Assignments that are labeled “missing” by the Blackboard system **will not** be accepted without the instructor’s prior written approval [email communication]. You will not be able to submit your assignments after the due date. It is your responsibility to inform [via email] your instructor ‘as soon as possible’ if you run into technical difficulties while submitting/posting your assignments on Blackboard. If this happens, you need to send your assignment via email before the due date so that your assignment can be graded for full credit.

**Attendance Policy:** Learning in this class is considered a communal endeavor as well as an individual undertaking. Therefore, students are expected to be present and prepared at the designated time for every class session and to remain engaged in class activities until the session has concluded. Class attendance is crucial for a full understanding of course material, because many of the topics and content will be taught and communicated through class demonstrations, activities, and discussions.

It is highly recommended that students exchange telephone numbers and/or e-mail addresses with other students in the course. If you are absent from a class contact your instructor or another student to find out what occurred during the class you were absent from. Tardies are considered

unprofessional behavior and result from anytime between 12:00 and 12: 15 PM. Three tardies (and/or leaving early [15 minutes]) will result in an unexcused absence.

- Your 1<sup>st</sup> absence is excused.
- Your 2<sup>nd</sup> absence will reduce your final grade 5 %.
- Every absence after your 2<sup>nd</sup> reduces your final grade 10 % per absence.

### **UTEP Teacher Education Department Policy on Course Absences**

The UTEP Teacher Education Department considers missing two weeks of class excessive. The student may be dropped for lack of attendance. If you miss two weeks of class, contact your instructor immediately.

### **Communicating Effectively Online**

When we talk face-to-face, we expect other people to observe certain rules of behavior. The same is true online. Here are a few pointers to help you communicate more effectively via e-mail and discussion boards:

- Clearly summarize the contents of your message in the subject line of your e-mail AND your discussion board postings.
- Avoid using all capital letters. USING ALL CAPS MAKES IT LOOK LIKE YOU'RE SHOUTING! IT'S ALSO MORE DIFFICULT TO READ.
- Avoid using sarcasm in your postings and e-mail messages. Sarcasm does not translate well in the online world. If you have a dry sense of humor, use smiles :) to defuse what could be constituted as an abrupt message (but don't over use them! :)).
- More information on Netiquette can be found at: [www.albion.com/netiquette](http://www.albion.com/netiquette)

### **Academic Dishonesty**

Academic Dishonesty is an assault upon the basic integrity and meaning of a university. Cheating, plagiarism, and collusion in dishonest activities are serious acts which erode the university's educational and research roles and cheapen the learning experience not only for the perpetrators, but also for the entire community. It is expected that UTEP students will understand and subscribe to the ideal of academic integrity and that they will be willing to bear individual responsibility for their work. Materials (written or otherwise) submitted to fulfill academic requirements must represent a student's own efforts. Any act of academic dishonesty attempted by a UTEP student is unacceptable and will not be tolerated. *All assignments with plagiarized material will be given a grade of 0. If you use ideas or written text from other people you must cite them.* Violations will be referred to the Dean of Students Office for possible disciplinary action. Students may be suspended or expelled from UTEP for such actions.

### **Disability Statement**

I will make any reasonable accommodations for students with limitations due to disabilities, including learning disabilities. Please see me personally before or after class in the first two weeks or make an appointment, to discuss any special needs you might have. If you have a disability and need classroom accommodations, please contact The Center for Accommodations and Support Services (CASS) at 747-5148, or by email to [cass@utep.edu](mailto:cass@utep.edu), or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at [www.sa.utep.edu/cass](http://www.sa.utep.edu/cass).

The Disabled Student Services Office can also be reached in the following ways:

Web: <http://www.utep.edu/cass/>

Phone: (915) 747-5148

Fax: (915) 747-8712

### Course Schedule and/or Assignment Changes

The course instructor reserves the right to adjust the course syllabus or change assignments as needed. While every effort will be made to adhere to the calendar and the course outlines, there will undoubtedly be changes due to unexpected situations or pacing that may arise during the semester. Every attempt will be made for advance 'warning.' These modifications will be based on the specific needs of all the students in the course, but not to exceed difficulty or the due dates of the originally proposed assignment.

**Assigned Reading Material:** Readings will be assigned and available via Blackboard in the Course Content Area. You will be responsible for reading these materials before class.

**Plagiarism:** Cheating is unethical and not acceptable. Plagiarism is using information or original wording in a paper without giving credit to the source of that information or wording; it is also not acceptable. Do not submit work under your name that you did not do yourself. You may not submit work for this class that you did for another class. If you are found to be cheating or plagiarizing, you will be subject to disciplinary action, per UTEP catalog policy. Refer to <http://www.utep.edu/dos/acadintg.htm> for further information.

**Multiple Submissions:** When turning in assignments, students may not resubmit work done for other courses. No credit will be given for a resubmission of a project or paper given in another class.

**Incomplete Grades:** An incomplete may be given if a student provides evidence of a documented illness or family crisis that precludes successful completion of the course.

**Format and Submission:** All written assignments should be double space (*except lesson plans*), font size 12 with 1 inch margins and **submitted on Blackboard**. Number your pages. Formal written projects are to follow the American Psychology Association (APA) format. Please ask if you have any questions about using the APA format, I will be happy to help!

### Course Schedule

Week	Date	Topic	Assignments Due
1	Jan. 23	<ul style="list-style-type: none"><li>• Introduction and overview</li><li>• How students learn science</li></ul> <p><b>Activity 1 (due by the end of class):</b> My views about science education concept map (IA)</p>	<p>Read the syllabus, and make sure your UTEP email is your primary email or forward your UTEP email to the email you use.</p> <p><b>Submit today in class your student information form (page 14 of the course syllabus)</b></p> <p>Read (in class): Llewellyn: Making the most out of concept maps Yager: <i>Never playing the game</i></p>

2	Jan. 30	<ul style="list-style-type: none"> <li>Who is a scientist?</li> <li>Reviewing science curricula</li> <li>Scientific inquiry: Spaghetti investigations</li> </ul> <p><b>Activity 2 (due by the end of class):</b> Basic inquiry skills: Bread on the rise (GA)</p>	<p>Read:</p> <ul style="list-style-type: none"> <li>Martin-Hansen: <i>Defining inquiry</i></li> <li>Finson: <i>Inference vs. Observation</i></li> </ul> <p><b>Submit today in class your student profile (page 15 of the syllabus)</b></p> <p><b>Take Syllabus quiz (Quiz #1)</b> on Blackboard before 01/31 at 5:30 pm.</p> <p><b>Sign up for Activity 12 presentations</b></p>
3	Feb. 6	<ul style="list-style-type: none"> <li>Reviewing science lesson samples</li> <li>Inquirizing your teaching: Investigating with parachutes</li> <li>Prior knowledge and common misconceptions: A Private Universe</li> </ul> <p><b>Activity 3 (due by the end of class):</b> Review of a lesson plan (GA)</p>	<p>Read:</p> <ul style="list-style-type: none"> <li>Scribner-MacLean: <i>More than just guessing</i></li> </ul> <p><b>Submit via Blackboard your 'autobiography as a science learner' before today's class. (Essay 1)</b></p> <p>Activity 12 presentation</p>
4	Feb. 13	<ul style="list-style-type: none"> <li>The Nature of science (NOS) (Part I)</li> </ul>	<p>Read:</p> <ul style="list-style-type: none"> <li>McComas: <i>Key ideas to teach about the nature of science</i></li> </ul> <p>Activity 12 presentation</p>
5	Feb. 20	<p><b>Activity 4 (due by the end of class):</b> Art and science grow together: Communicating through art</p> <p><b>Activity 5 (due via BB):</b> Scientific misconceptions based on class meeting # 3</p>	<p>Read:</p> <ul style="list-style-type: none"> <li>Porter et al: <i>The art and science of notebooks</i></li> </ul> <p><b>Take quiz #2 before today's class</b></p>
6	Feb. 27	<ul style="list-style-type: none"> <li>Teaching the language of science to ELLs</li> <li>Measurement through inquiry: Hands-on activity: Airplane design</li> </ul>	<p>Read:</p> <ul style="list-style-type: none"> <li>Crowther et al: <i>Academic vocabulary instruction</i></li> </ul> <p><b>Submit the first draft of your science teaching philosophy (essay 2)</b></p> <p>Activity 12 presentation</p>
7	Mar. 6	<ul style="list-style-type: none"> <li>The Nature of Science NOS (Part II)</li> </ul> <p><b>Activity 6 (due at the end of class):</b> Inquiry investigation with plants (part I) (GA)</p>	<p>Read:</p> <ul style="list-style-type: none"> <li>Crowther et al: <i>Understanding the meaning of the NOS</i></li> </ul>

		<i>March 10-14: Spring Break (No class)</i>	<b>Take online quiz #3 before today's class</b> <i>Activity 12 presentation</i>
8	Mar. 20	<ul style="list-style-type: none"> <li>Examining student work</li> </ul> <b>Activity 7 (due at the end of class):</b> Outlining a 5E lesson plan (GA)	<i>Activity 12 presentation</i>
9	Mar. 27	<ul style="list-style-type: none"> <li>Literacy connections</li> <li>Inquiry skills: Designing windmills</li> </ul> <b>Activity 8 (due at the beginning of class):</b> Inquiry investigation with plants (part II) (GA)	Read: <ul style="list-style-type: none"> <li>Munakata: <i>Lessons from the little prince</i></li> </ul> <i>Activity 12 presentation</i>
10	Apr. 3	<ul style="list-style-type: none"> <li>Accommodating ELLs in the science classroom (I): The SIOP Model</li> <li>Inquiry skills: Investigating with rubber bands</li> </ul>	<b>Take online quiz #4 before today's class.</b>  <b>Submit lesson plan for peer review via BB by 5:30 pm. (one per group)</b>  <i>Activity 12 presentation</i>
11	Apr. 10	<ul style="list-style-type: none"> <li>Accommodating ELLs in the science classroom (II)</li> </ul> <b>Activity 9 (due via BB):</b> Lesson peer review (IA)	Read: <ul style="list-style-type: none"> <li>Armon &amp; Morris: <i>Integrating assessment for ELLs</i></li> </ul> <i>Activity 12 presentation</i>
12	Apr. 17	<ul style="list-style-type: none"> <li>Writing in the science classroom</li> <li>Science journaling</li> </ul> <b>Activity 10 (due at the beginning of class):</b> Inquiry investigation with plants (part III) (GA)	
13	Apr. 24	<ul style="list-style-type: none"> <li><b>No class meeting:</b> Class time is fulfilled by the science teaching day on UTEP campus on Saturday, <b>April 26<sup>th</sup></b>.</li> </ul>	<b>Submit lesson plan addressing feedback from the reviewers via BB by 5:30 pm. (one per group only*)</b>
14	May 1	<ul style="list-style-type: none"> <li>Art and science grow together (II)</li> </ul> <b>Activity 11 (due at the end of class):</b> Art and science project approval (GA)	<i>Activity 12 presentation</i>

15	May 8 <i>last day of classes</i>	<ul style="list-style-type: none"> <li>• Investigating with plants: In class discussion and project presentations</li> <li>• Discussion on the philosophy of science teaching</li> <li>• Who is a scientist?</li> </ul> <div data-bbox="440 373 951 464" style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <b>Activity 12 (in class):</b> Understanding the NSES, TEKS, and the NGSS (GA) </div>	<div data-bbox="1036 205 1318 247" style="border: 1px solid black; border-radius: 10px; padding: 5px; text-align: center;"> <i>Activity 12 presentation</i> </div>
16	May 12 - 16		<ul style="list-style-type: none"> <li>• <b>Submit the last draft of your science teaching philosophy (essay 3)</b></li> <li>• <b>Submit reflections 1 and 2</b></li> </ul>

*\*In case multiple lesson plans are submitted by members of a group, the instruction will grade only the first submission.*

## References

- Armon, J., & Morris, L. (2008) Integrating Assessments for ELL. *Science & Children*, 45(8), 49-53.
- Crowther, D. T., Tibbs, E., Wallstrum, R., Storke, E., & Leonis, B. (2011). Academic vocabulary instruction within inquiry science: The Blended/Tiered approach. *AccELerate!* 3(4), 17-20.
- Hansen-Martin, L. (2002). *The Science Teacher*, 34-37.
- Michaels, S., Shouse, A. & Schweingruber, H. (2008). Ready, Set, Science! Putting Research to Work in K-8 Science Classrooms. National Academy Press.
- Munakata, M. (2005). Lessons from the little prince. *Science & Children*, 40-42.
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- Yager, R. E. 1988. Never playing the game. *The Science Teacher* 55 (6): 77.

**EDEL/BED 4311: Teaching Science in the Elementary School – fall 2013**  
**Student Information Form**

Name: \_\_\_\_\_ Preferred Name: \_\_\_\_\_ Email Address: \_\_\_\_\_

Major: \_\_\_\_\_

Hobbies and interests:

\_\_\_\_\_

Science courses you have taken in college. If possible, include details such as how many years ago.

\_\_\_\_\_

\_\_\_\_\_

Your favorite subject/class:

A. In elementary school: \_\_\_\_\_

B. In high school: \_\_\_\_\_

C. In college: \_\_\_\_\_

Please, share your views on the following questions:

1. Why did you choose to become an elementary teacher?

\_\_\_\_\_

\_\_\_\_\_

2. Please describe briefly your experience/es with science and whether they were positive or negative.

\_\_\_\_\_

\_\_\_\_\_

3. Suggest two goals you would like to accomplish in this course by the end of the semester

A. \_\_\_\_\_

\_\_\_\_\_

B. \_\_\_\_\_

\_\_\_\_\_

4. Would you call yourself a science teacher? Why? Or why not?

\_\_\_\_\_

\_\_\_\_\_

5. How would you define:

A. Science

\_\_\_\_\_

\_\_\_\_\_

B. Scientific Inquiry

\_\_\_\_\_

\_\_\_\_\_

C. Curriculum or curricula

\_\_\_\_\_

\_\_\_\_\_

6. Please, indicate on the scale below your knowledge of and previous experience with lesson planning:

Minimal										Extensive
1	2	3	4	5	6	7	8	9	10	

**Student Profile**

\_\_\_\_\_

(Last Name) (First Name)

Email address: \_\_\_\_\_

Local phone\*: \_\_\_\_\_ Home phone\* (if different) \_\_\_\_\_

Objections to syllabus or what other content do you think this course should cover and why?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Any additional comments you may have (e.g. what you hope to do professionally, health problems, experiences at UTEP, etc. that your instructor should be informed).

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Time of the week you use to work on your school assignments: \_\_\_\_\_

Also feel free to discuss with the instructor any difficulties you may have with the course.

***I read and fully understand the requirements and course policies as stated in this syllabus.***

\_\_\_\_\_  
Student Signature

\_\_\_\_\_  
Date

\*Optional

## **Link to TExES competencies (science domain)**

**The objectives of this course address the following Texas Examinations of Educator Standards (TExES) competencies in the science domain for the Generalist EC-6 and Bilingual Generalist EC-6 programs.**

### **Competency (safe and proper laboratory processes)**

The beginning teacher:

- D. Selects and safely uses appropriate tools, technologies, materials and equipment needed for instructional activities.
- E. Understands concepts of precision, accuracy and error with regard to reading and recording numerical data from a scientific instrument.
- F. Understands how to gather, organize, display and communicate data in a variety of ways (e.g., charts, tables, graphs, diagrams, written reports, oral presentations).
- G. Understands the international system of measurement (i.e., metric system) and performs unit conversions within measurement systems.

### **Competency (scientific inquiry)**

The beginning teacher:

- A. Understands plans and implements instruction that provides opportunities for all students to engage in non-experimental- and experimental-inquiry investigations.
- B. Focuses inquiry-based instruction on questions and issues relevant to students and uses strategies to assist students with generating, refining and focusing scientific questions and hypotheses.
- D. Knows how to guide students in making systematic observations and measurements.
- E. Knows how to promote the use of critical-thinking skills, logical reasoning and scientific problem solving to reach conclusions based on evidence.
- F. Knows how to teach students to develop, analyze and evaluate different explanations for a given scientific result.
- G. Knows how to teach students to demonstrate an understanding of potential sources of error in inquiry-based investigation.
- H. Knows how to teach students to demonstrate an understanding of how to communicate and defend the results of an inquiry-based investigation.
- J. Understands the roles that logical reasoning, verifiable evidence, prediction and peer review play in the process of generating and evaluating scientific knowledge.
- K. Understands the historical development of science and the contributions that diverse cultures and individuals of both genders have made to scientific knowledge.

### **Competency (impact on daily life/environment)**

The beginning teacher:

- A. Understands that decisions about the use of science are based on factors such as ethical standards, economics and personal and societal needs.
- F. Understands the role science can play in helping resolve personal, societal and global challenges.

### **Competency (unifying concepts and processes in science)**

The beginning teacher:

- A. Understands how a unifying, explanatory framework across the science disciplines is provided by the concepts and processes of systems, order and organization; evidence, models and explanation; change, constancy and measurements; and form and function.

- B. Demonstrates an understanding of how patterns in observations and data can be used to make explanations and predictions.
- F. Understands how change and constancy occur in systems.
- G. Understands the complementary nature of form and function in a given system.

**Competency** (theory and practice of science teaching)

The beginning teacher:

- A. Understands how developmental characteristics, prior knowledge and experience and students' attitudes influence science learning.
- B. Selects and adapts science curricula, content, instructional materials and activities to meet the levels of interest, knowledge and understanding as well as the abilities, experiences and needs of all students, including English-language learners.
- C. Understands how to use situations from students' daily lives to develop instructional materials that investigate how science can be used to make informed decisions.
- D. Understands common misconceptions in science and has effective ways to address those misconceptions.
- E. Understands developmentally appropriate design and implementation of hands-on learning experiences in science and selects effective, appropriate instructional practices, activities, technologies and materials to promote students' scientific knowledge, skills and inquiry processes.

**Competency** (assessments in science learning)

The beginning teacher:

- B. Understands the importance of monitoring and assessing students' understanding of science concepts and skills on an ongoing basis, including how to use formal and informal assessments of student performance and how to use products (e.g., projects, lab journals, rubrics, portfolios, student profiles, checklists) to evaluate students' understanding of and participation in the inquiry process.
- C. Selects — or designs — and administers a variety of appropriate assessment methods (e.g., performance assessment, self-assessment, formal/informal assessment, formative/summative assessment) to monitor students' understanding and progress and to plan for instruction.

**Competency** (life science)

The beginning teacher:

- A. Understands that living systems have different structures that perform different functions.
- B. Understands and describes stages in the life cycles of common plants and animals.
- C. Understands that organisms have basic needs.