

*Syllabus*  
*Education Department – Lincoln University*  
*EDU 315*  
*Science Methods*

Instructor: Prof. Kenneth Parker  
Credits: 3  
Room:  
Time:  
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Office Hours: As posted  
Dates:

**Course Description:**

EDU-315, (3 credits), is a course designed to provide students with the natural science concepts that are taught in the Early Childhood and Elementary classroom settings as well as the various teaching methodologies for the teaching of these concepts. Students will develop lessons in the content areas and have the opportunity for the evaluation of these lessons.

Pre-service teachers will investigate the characteristics of a quality early childhood/elementary science program. Investigations will include building on children's prior experiences, drawing on children's curiosity, encouraging children to pursue their own questions, engaging children in in-depth exploration of a topic, and fostering of inquiry.

Materials, methods, and strategies for teaching life, physical, earth and space, and sustainability science will be presented. This course will place emphasis on hands-on approaches, project-based approaches, investigation, experimentation, and knowledge-base enhancement. The course will seek to help pre-service teachers to develop an understanding and appreciation of science that will make an impression to help children acquire knowledge, attitudes, and skills essential to science literacy.

This course addresses the following Pennsylvania Department of Education Competencies: *Science Foundations and Methods*.

The 150 hours of Pre-Student Teaching are met through 3 clusters of methods courses:

Junior Block I includes EDU 304, EDU 311, and **EDU 315** – 50 hours;

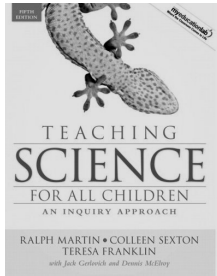
Junior Block II includes EDU 313, EDU 312, and EDU 308 – 50 hours

Senior Block includes EDU 310, EDU 314, and EDU 330 – 50 hours

**Concurrent Courses for Pre-Student Teaching**

Pre-service teachers are to enroll concurrently in EDU-304, EDU-311, and **EDU-315** in order to meet 50 Pre-Student Teaching hours. This is the beginning of student teaching in which candidates teach small groups of students in schools and early learning settings. This field experience is a combination of individual tutorials, small group, and whole class instruction at the selected grade level over the course of the semester. Pre-service teachers work with materials that they have prepared and created for classroom instruction.

## **Required Text:**



Martin, Ralph, Sexton, Colleen, and Franklin, Teresa. Teaching Science for All Children – An Inquiry Approach. 5<sup>th</sup> Edition. Pearson. 2009.

## **Course Requirements:**

- Textbook
- Class attendance at every session and full participation
- Satisfactory and timely completion of the mid-term exam, final exam, quizzes, and all assignments
- Timely submission of 2 lesson plans in elementary science
- Execution of a micro peer-teaching presentation in elementary science
- Participation in the “Outdoor Classroom” – a one-day project-based learning field experience
- Completion and presentation of an elementary science project
- Field pre-student teaching in a classroom setting

## **Course Objectives:**

Through reading assignments, discussions, and class activities, pre-service teachers will:

- Be provided with opportunities to design and conduct investigations and experiments.
- Engage in planning, organizing, critiquing, teaching, and assessing meaningful, integrated, and functional science lessons.
- Identify and demonstrate evaluative procedures for assessing science learning.
- Examine the Pennsylvania Department of Education Academic Standards for Science and utilize those standards for instructional planning.
- Participate in skills and strategies used in hands-on and inquiry-based science approaches.
- Enhance their science knowledge base relative to content.
- Develop skills in utilizing appropriate and creative instructional formats, strategies, and assessment instruments for teaching science in the elementary classroom.
- Develop instructional skills that speak to high-order thinking, diversity, varied learning styles, varied academic abilities, and divergent student behaviors.

**Learner Outcomes:**

- Listen and effectively communicate ideals through written, spoken, and visual means.
- Think critically via classifying, analyzing, comparing, contrasting, hypothesizing, synthesizing, extrapolating and evaluating ideas.
- Apply information literacy/research skills to assist the systematic process of critical thought; articulating the problem; gathering information from multiple sources and venues; evaluating the accuracy/thoroughness/timeliness of the collected data, and determining when/if the problem has been satisfactorily resolved.
- Apply and evaluate quantitative reasoning through the disciplines of mathematics, computational science, laboratory science, science, and other like-minded approaches that require precision of thought.
- Effectively plan instructional programs for Pre-K – 4.
- Effectively implement, adapt and evaluate instructional strategies and curricular content for Pre-K – 4.
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- Recognize that all students can be science learners.

**Expectations:**

- Students are expected to attend all classes. Class attendance will be a part of the final evaluation. Students are expected to arrive for class on time. Any student who arrives late will not be given additional time to complete quizzes, exams, or in-class assignments.
- Students are expected to submit all assignments on time. Late submissions will not be accepted.
- Students are expected to come to class having read all assignments, and to participate in class discussions.
- Students are expected to complete all quizzes and examinations in class on the date specified by the instructor.
- Students are expected to word process all assignments.

**Evaluation:**

Attendance	5%
Assignments/Participation in all class activities:	10%
Mid-Term & Final Exam:	30%
Micro Peer-Teaching Presentation with Lesson Plan:	5%
Quizzes:	20%
Lesson Plans (2):	10%
Outdoor Classroom Practicum Experience	5%
Science Project:	5%
Field Teaching:	<u>10%</u>
Total:	100%

**Weekly Topics:**

Week 1	The Nature of Science <i>Children's Science Perceptions, Changes in Elementary Science, Characteristics of Science</i>
Week 2	How Children Learn Science <i>Children's Ideas, How Children Learn Science, Constructivist Learning and Science</i>
Week 3	Science for Diverse Learners <i>Science for All, Science for Exceptional Children</i>
Week 4	Planning for the Inquiry-Based Classroom <i>Concept Mapping, Planning Inquiry-Based Science Lessons</i>
Week 5	Inquiry Methods Helping Learners Construct Understanding <i>Scientific Literacy, Promoting Concept Formation, The Scientific Method, Promoting Cooperative Inquiry</i>
Week 6	Using Questions to Foster Scientific Inquiry <i>Questions Affecting Students, Types of Questions, Improving Questioning Using Students' Questions</i>
Week 7	Developing Authentic Assessment <i>Evaluating Student Learning, Selecting and Developing Assessment</i>
Week 8	Integrating Science with Other Disciplines <i>Approaches to Integration</i>
<b>MID-TERM EXAMINATION</b>	
Week 9	Designing and Managing an Inquiry-Based Science Classroom <i>Safe Science Experiences, Planning for Safety</i>
Week 10	Materials and Resources for Promoting Inquiry-Based Science <i>Using Textbooks, Best Practices, Resources for Best Practices</i>
Week 11	Content-Based Unit I <i>The Earth in Space</i>
Week 12	Content-Based Unit II <i>Sustainability Science</i>

Week 13                      Project-Based Learning  
**Outdoor Classroom Practicum Experience**

Week 14                      Environmental Protection Approaches

**FINAL EXAMINATION**

*Notes:*

- This course adheres to the Lincoln University Academic Integrity Statement which can be found on pages 54-55 of the 2003-2006 Lincoln University Bulletin.
- This course adheres to the Lincoln University Class Attendance Regulations which can be found on pages 60-61 of the 2003-2006 Lincoln University Bulletin.
- *This course adheres to the PDE PreK-4 Program Specific Guidelines, 2008, Candidate Competencies as they relate to curriculum, education foundation, child development theory, classroom environment, science, diversity, and assessment.*
- The instructor of this course is required to comply with the PDE Code of Professional Practice and Conduct for Educators which can be found at <http://www.teaching.state.pa.us>.