

ESCI 4420: Science for Early Childhood Education
Spring 2007

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The course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary.

Required text Tippins, D.J., Koballa, T.R., & Payne, B.D. (2002). *Learning from cases: Unraveling the complexities of elementary science teaching*. Boston: Allyn & Bacon.

Additional texts Articles/chapters to be distributed in class

Reference materials (available online) Georgia Performance Standards
<http://www.georgiastandards.org/science.aspx>

American Association for the Advancement of Science. (1990). *Science for All Americans: Project 2061*. New York: Oxford University Press.
<http://www.project2061.org/publications/sfaa/online/sfaatoc.htm>

American Association for the Advancement of Science. (1993). *Benchmarks for Science Literacy*. New York: Oxford University Press.
<http://www.project2061.org/publications/bsl/online/bolintro.htm>

National Research Council. (1996). *National Science Education Standards*. Washington, DC: National Academy Press.
<http://fermat.nap.edu/openbook/0309053269/html/index.html>

National Research Council. (2000). *Inquiry and the National Science Education Standards*. Washington, DC: National Academy Press.
<http://fermat.nap.edu/openbook/0309064767/html/index.html>

Miscellaneous Project Wild (\$15)

Course description

This course is intended to introduce prospective elementary teachers to the practice of teaching science. Building upon current research on science teaching and learning, we will explore:

- Elementary science curriculum and state/national science education standards;
- Learning environments that support students' understandings of science content and the nature of scientific knowledge;
- Forms of assessment that tap into students' understandings of science;
- Science instruction that supports the goals/needs of diverse groups of students.

Objectives

My main goal is to guide you to become a reflective practitioner. Being reflective means being thoughtful and critical about the science learning experiences you enact in your classroom. In order to enact productive science learning experiences for your students, you must consider the backgrounds and experiences your students bring to your classroom. You must be thoughtful about the experiences you provide for your students, and you must consider how these experiences support their understandings of science. Being a reflective practitioner involves continuously evaluating your understanding of science content, your goals for student learning, the manner in which you engage students in science content and processes, the ways in which students participate in science learning experiences, and the ways in which students show evidence of meeting your learning goals.

Please keep in mind that teaching science (or any topic) is a highly complex practice. The complexity is due to the interplay between your understanding of science, the understandings of science your students hold, and your ability to orchestrate science learning experiences in your classroom. It is your responsibility to learn how to negotiate your classroom environment and determine which instructional strategies meet your needs and goals, as well as the needs and goals of your students. Therefore, the intent of this course is to help you develop competencies that enable you to make informed curricular and instructional decisions.

The goals for this course include:

1. Developing and reflecting on your science content understanding, as well as your understanding of the nature of scientific knowledge;
2. Becoming familiar with research on science learning (e.g., students' conceptions of science, how these conceptions influence science learning, how teaching practices support science learning, etc.);
3. Developing competencies that allow you to make informed decisions about curriculum and instruction in your classroom;
4. Understanding how to employ various forms of assessment to evaluate student learning and how to adjust instruction in relation to information gained from assessment;
5. Developing an understanding of diversity and equity and an understanding of how you can organize your teaching practices to meet the needs of all students in your class;

6. Developing an understanding of your goals as a teacher of science and reflecting on how the decisions you make about curriculum and instruction support or hinder these goals;
7. Developing habits of mind that allow for professional development. This course is one step toward becoming a science teacher. In order for you to serve your students well, it is important that you continue to refine your ideas about science teaching and learning.

Assignments

Reading response papers (10%)

The readings for this course are integral for developing and reflecting on your ideas about science teaching. You are responsible for submitting a response paper for each reading assignment. For most readings, I will provide questions to which you should respond. Papers should be approximately one page in length. Additionally, please write 2 questions for discussion.

Text resources in elementary science (10%)

Children's literature can be a useful resource when teaching science, particularly if you select texts that can be used to support conceptual understandings. For this assignment, you will identify and evaluate text resources (e.g., trade books) you could use to when teaching earth science, physical science, and life science. You will share your findings with your peers via a presentation and written materials.

Microteaching I (10%)

For this assignment, you and a partner will develop and teach a science lesson. This activity is intended to give you an opportunity to experience the range of practices associated with teaching a science lesson. You and your partner will be required to submit a lesson plan for this assignment.

Field experience assignments

1. Students' ideas about science (20%)

Select one of the following:

- a. Interview three students about their ideas about a particular science topic. Try to select students who represent the range of the overall population in the class;
- b. Write and administer an assessment about students' understandings of a science topic;
- c. Propose a project to fulfill this assignment, although please consult me prior to beginning your project. If you choose to propose a project please explain how it addresses students' understandings of science.

2. Teaching science in the elementary classroom (20%)

- a. Teach at least one science lesson
- b. Design and conduct at least one science center investigation

You will be required to develop a lesson plan for this assignment, and *you must submit the lesson for approval prior to teaching it*. I may ask you to revise your lesson, so please allow sufficient time to make revisions. After teaching your lesson, you will interview at least one student to assess his/her understanding of the ideas you presented.

3. Your perspective on science teaching (10%)

- a. Reflect on what it means to teach science in an elementary classroom. Specific questions I would like you to address include:
 - i. What are you most excited about in terms of teaching science in your classroom?
 - ii. What issues do you find most vexing about teaching science?
 - iii. Why do you find these issues vexing?
 - iv. How do you propose to address your vexation? Why do you think this is a fruitful solution?

Microteaching II (5%)

Following field experience we will do a second microteaching activity.

Science teaching portfolio (15%)

Throughout the semester you should be collecting materials/ideas you can use in your classroom (e.g., resources, lesson plans). Prior to field experience, you will be required to submit a draft of your portfolio. The final portfolio will be due at the end of the semester.

Course Policies

Attendance and participation/professionalism

Attendance and participation/professionalism will affect your final grade. Regular and punctual attendance is an important part of this course. *If you miss more than two class sessions your final grade will drop by one grade level (e.g., from A- to B+)*. Exemptions may be granted in cases of serious illness, death in the family, religious observance, and other events that fall under the guidelines for an excused absence. Please inform me *in advance* if you are going to be absent from class.

As a class, we will explore and develop ideas related to science teaching and learning. Your participation will enhance the quality of your experience and that of your classmates. Participation involves being a thoughtful contributor to class discussions and activities. I expect that you will come to class prepared to participate in our class discussions. *Your final grade will drop by one grade level (e.g., from A- to B+) if participation/professionalism becomes problematic.*

All assignments must be handed in on or before the day they are due. If an assignment is late, there will be a reduction of one grade level per day overdue. I expect you to type and proofread your assignments. (Response papers do not have to be typed.)

All academic work must meet the standards contained in “A Culture of Honesty.” All students are responsible to inform themselves about those standards before performing any academic work (<http://www.uga.edu/~ovpi/honesty/ah.pdf>).

Please turn off your cell phone prior to coming to class (i.e., no phone calls and no text messaging).

Grading

Your final grade will be calculated based on the following:

100-93=A, 92-90=A-

89-87=B+, 86-83=B, 82-80=B-

79-77=C+, 76-73=C, 72-70=C-

69-67=D+, 66-63=D, 62-60=D-

Below 60=F

Keep in mind that you choose the quality of the work you submit. You can earn an A by submitting assignments that exhibit exemplary quality.

If you are unsatisfied with your performance on an assignment, you may revise and resubmit it. You must submit your revised assignment no later than one week after the assignment was returned to you. Your final grade on the assignment will be the average of the grade you received on the original assignment and the grade you received on the revised version.

DATE	TOPIC	READING (date assigned)	ASSIGNMENTS DUE
Jan 9	Introduction to the course Goals of science education	Settlage & Southerland chapter; <i>SFAA</i> pp. 1-12 (1)	
Jan 11	The nature of scientific knowledge	<i>SFAA</i> ch. 4 (2)	Reading Response (RR) 1
Jan 16	Physical science	<i>SFAA</i> ch. 5 & 6 (3)	RR 2
Jan 18	Life science	Settlage & Southerland ch. 4 (4)	RR 3
Jan 23	Perspectives on science learning	Bell et al.; Anderson et al.; <i>NSES</i> vignettes (5)	RR 4
Jan 25	Inquiry-based science instruction	Reardon (6)	RR 5
Jan 30	Inquiry-based science instruction	T, K, P ch. 2; Yopp & Yopp (7)	RR 6
Feb 1	Text resources in elementary science		RR 7
Feb 6	Text resources presentations	T, K, P ch. 6 (8)	Text resources assignment
Feb 8	Curriculum evaluation		RR 8
Feb 13	Microteaching I		
Feb 15	Microteaching I	T, K, P ch. 7 (9)	Draft of portfolio
Feb 20	Assessing understanding	T, K, P ch. 5 (10)	RR 9
Feb 22	Preparing for field experience		RR 10
Feb 26-March 30 FIELD EXPERIENCE (Spring Break March 12-16) Field assignments 1 & 2 due during field experience			
Apr 3	Field experience debriefing		Field assignment #3
Apr 5	Field experience presentations		
Apr 10	Project Wild		
Apr 12	Project Wild		
Apr 17	Microteaching II		
Apr 19	Microteaching II		
Apr 24	Microteaching II		
Apr 26	Microteaching II		Final portfolio