

ESCI 4420: Science For Early Childhood Education Fall 2008

[Deviations may be discussed and negotiated throughout the semester.]

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| Instructor: Ji Shen, PhD | Classroom: | 213 Aderhold Hall |
| Office: 212-H Aderhold Hall | Class Schedule: | Monday 8:00 – 11:00 AM |
| Phone: (706) 542-4646 | Office Hour: | Monday 11:00 AM – Noon |
| Email: jjshen@uga.edu | | or by appointments |

Teaching Assistant: Marion Reeves

Office:

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❖ Course Materials

- Required Textbook:
Tippins, D.J., Koballa, T. R. & Payne, B.D. (2002). *Learning from cases: Unraveling the complexities of elementary science teaching*. Boston, MA: Allyn & Bacon.
- Project WILD (<http://www.projectwild.org/>) training materials (\$15)
- Online Materials:
Georgia Performance Standards -- Science
<http://www.georgiastandards.org/science.aspx>
National Science Education Standards by National Research Council
<http://www.nap.edu/html/nses/>
AAAS Project 2061 Benchmarks
<http://www.project2061.org/publications/bsl/online/bolintro.htm>
Early Childhood STEM Education by AAAS
<http://www.project2061.org/publications/earlychild/online/default.htm>
- Additional materials will be distributed in class.

❖ Course Description

Welcome! This course is intended to discuss the goals for elementary science teaching and learning and practice activities appropriate for early childhood education. During the semester, the class will create an environment to E.D.U.C.A.T.E.:

- Examine elementary science curricula and state/national standards;
- Design classroom environments that encourage inquiry learning;
- Understand what is the nature of science and scientific knowledge;
- Create friendly learning conditions that engage all students;
- Assess student understanding using different methods;
- Try innovative instructional strategies with the aid of educational technology;
- Explore instructional tools and resources for early childhood science educators.

Throughout the semester you will be involved in both independent work and group activities that will build your confidence to become a competent science teacher of K-8.

❖ Expectations

- **Academic Honesty:** All students in the class are subject to the UGA Academic Honesty Policy guidelines for the definition and processes of academic integrity. Please refer to this website for more information (<http://www.uga.edu/honesty/ahpd/ACOH%20May%20'07.pdf>).
- **Active participation:** You are expected to share ideas and resources, collaborate with your peers when appropriate during class discussion and group activities. Your final grade will be affected by the quality of your class participation.
- **Punctual attendance:** You are expected to attend all class sessions except emergency leaves (serious illness, death in family, etc.) You are responsible to let the instructors know in advance for such leaves.
- **Prompt finish:** You are expected to turn in your homework on time and finish advance preparation. You need to constantly and critically reflect on your homework, readings and other activities.

❖ Evaluation & Grading

Your performance of the course is evaluated by four components, each with 25 points.

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| (1) Classroom Participation | 25 points |
| (2) Weekly Journals | 25 points |
| (3) Field Work | 25 points |
| (4) Mini Lesson | 25 points |
| Total | |
| 100 points | |

Your final grade of the course will be determined using the following scale table:

| Grade | Points | Grade | Points | Grade | Points | Grade | Points |
|-------|--------|-------|--------|-------|--------|-------|--------|
| | | B+ | 87-89 | C+ | 76-79 | D+ | 67-69 |
| A | 93-100 | B | 84-86 | C | 73-75 | D | 64-66 |
| A- | 90-92 | B- | 80-83 | C- | 70-72 | D- | 60-63 |

A score below 60 is considered Failure of the course.

(1) Classroom Participation: 25%

Active participation shows your engagement in the course and your respect to your colleagues when it comes to sharing and discussion. Active participation involves reading assignments, hands-on activities, and class discussions.

Missing one session without notification will result in a penalty of 3 points deducted from your total points. Missing more than five sessions without notification will result in a failing grade for the course.

(2) Weekly Journals: 25%

Journaling is a powerful tool for organizing your thoughts and reflecting on your learning. It is also a channel for you to communicate with the instructors. Your journals will reflect on a paper you read, activity you did, concept you learned, observations you made, or plans of teaching a topic. You may also address questions you have regarding the course.

Journals will be completed between class sessions for the first 10 classes and will be due 8am each Monday. Journal format: electronic, font size 12, double-spaced, 1-2 pages. Email your journals to jishen@uga.edu

Failure to turn in your journal on time will result in a penalty of 1 point deducted from your score. No journals will be accepted for grading more than one week after its due day. Each of your journals will be graded using a scale from 0 to 5. Your journal entry will be graded by the following criteria:

- Structure: clearly structured and easy to follow;
- Topic: in-depth discussion of more than one topic;
- Connection: making connections to classroom instruction;
- Question: raising good questions.

(3) Fieldwork: 25%

The score of your fieldwork for this course consists of two parts: (I) a report of observations of experienced teaching (15 pts); (II) a report of student ideas on a specific science topic (10 pts). Both reports are due 5pm, Nov. 21st (Friday). Revisions may be resubmitted and due 5pm, Dec. 12th (Friday).

(I) Report of Observation of Master Teaching (15 pts)

- Observe a class of an experienced science teacher and report the following (10pts)
 - Class background: e.g., topic of class, number of students, general class structure (estimate the percentages of small group activity, lecture time, quiz, whole class discussion, etc.).
 - How are students engaged and what difficulties students encounter? Please provide examples.
 - How do the teacher handle students' questions? Please provide examples.
 - What do you learn from this lesson? What you might have done differently?
- Interview the teacher and report the following (5pts)
 - What curriculum/materials are used in his/her class?
 - Why does he/she pick these materials?
 - What are the strategies the teacher uses in general when he/she handles student questions?
 - What is the general philosophy of teaching science for him/her? Do you agree?

(II) Report of Student Ideas on A Specific Topic (10 pts)

- Pick a science topic and investigate what ideas students have. Report the following:
 - Why do you pick this topic?
 - What does the literature say about the topic?
 - What data do you collect and how do you collect them? (data formats may include formal/informal interviews, written response/drawings, classroom observations, etc.)
 - Possible remedies in instruction to address student misconceptions.

(4) Mini Lesson: 25%

Your score of the mini lesson has two components: (I) a written lesson plan (15 pts); (II) teaching/co-teaching a mini lesson to the class (10 pts). You may choose to team with a partner to accomplish this task.

(I) Lesson Plan (15 pts)

- Your lesson plan should address, but not exclusive to, the following:
 - Conceptual Flow: What is the big idea(s) you address? What is the connection between ideas? What alternative ideas student may have on this topic?
 - Activities: What materials are needed in the lesson? What activities you will have students do and in what formats?
 - Assessments: How do you know what students know? How do you know if students learn or not?

(II) Mini Teaching (10 pts)

- The quality of your mini lesson will be evaluated by your classmates in five components with the following rubric.

| Criteria | 2 | 1 | 0 |
|---|--|---|--|
| Organization | Well organized; Concepts flow well. | Generally organized; Concepts flow ok. | Unclear and hard to follow. |
| Presentation | High quality of communication; Ideas are clearly presented. | Fair presentation. Ideas are delivered. | Hard to understand and confusing presentation. |
| Activities | Impressive use of materials and activities to teach science. | Use some materials and activities to teach the concept. | Solely rely on lecture. |
| Interaction | Engage students and give many opportunities for students to discuss. | Give some opportunities for students to discuss. | Purely teacher centered. |
| Effectiveness of assessment of learning | Use multiple & effective ways to assess student learning | Reasonable effort to assess student knowledge | No assessment is used. |

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| Date | Topics | Assignments | Sign-up |
|-------------|---|---|----------------|
| Aug 18 | Introduction; Course Overview; Student Ideas | Journal-1 Readings: Ziman (1968), Case 10.1, AAAS Benchmarks Chap.1 | -- |
| Aug 25 | Nature of Science; Observations; Shadow & Light | Journal-2 Readings: Smith (1981), Cases 6.1, 6.2, Lind (1999) ["Science in Early Childhood" in "Early Childhood STEM Education by AAAS" on WebCT] | -- |
| Sep 01 | *** Labor Day: Enjoy *** | | |
| Sep 08 | Age Appropriateness; Motions of the Sun/Moon Phases of the Moon | Journal-3 Readings: Cases 2.1, 4.1, 4.2, 7.3 | Coordinators: |
| Sep 15 | Guided Inquiry; Balance; Electricity | Journal-4 Readings: Cases 3.3, 4.4, 7.1, 7.2 | Coordinators: |
| Sep 22 | Standards; Assessments; Create Assessment Items | Journal-5 Readings: Lehrer & Schauble (2000) (1. Inventing Data; 2. Modeling) | Coordinators: |
| Sep 29 | Data Modeling; Representation; Position and Motion | Journal-6 Readings: Cases 5.2, 5.3, 5.4, 9.2 | Coordinators: |
| Oct 06 | Diversity of Learners; Rocks (by Dr. Tippins) | Journal-7 Readings: Hempel (1960), Cases 6.4, 9.1, 9.3 | Coordinators: |
| Oct 13 | Socio-scientific issues; (Maybe Project Wild) | Journal-8 Readings: Case 8.3 Visit (a) Museum of Art, (b) Botanical Garden, or (c) Sandy Creek Nature Center | Coordinators: |
| Oct 20 | Formal vs Informal Learning; Natural History | Journal-9 Readings: Hyde et al (2008); New (1999) ["Playing Fair and Square" in "Early Childhood STEM Education by AAAS" on WebCT] | Coordinators: |
| Oct 27 | Equity; Individual Meetings (Class ends at 9:45, Provide agenda for discussion prior to your individual meeting.) | Journal-10 Readings: Cases 8.2, 9.4, Clements (1999) ["Young Children and Technology" in "Early Childhood STEM Education by AAAS" on WebCT] | Coordinator: |
| Nov 03 | Educational Technology Individual Meetings (Class ends at 9:45, Provide agenda for discussion prior to your individual meeting.) | Readings: Case 3.2, [Project based learning, TBA] | -- |

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| Nov 10 | *** Fieldwork: Observation of Master Teaching & Investigation of Student Ideas *** | | |
| Nov 17 | Community of Learners; Project Based Learning; Resource Sharing | Your reports are due on Friday, 11/21. | -- |
| Nov 24 | *** Thanksgiving: Enjoy *** | | |
| Dec 01 | Mini Teaching | Peer Evaluation In Class | 1 2 3 4 5 6 7 |
| Dec 08 | Mini Teaching | Peer Evaluation In Class Class Evaluation Your lesson plan (and revised reports) is due on Friday, 12/12. | 8 9 10 11 12 13 14 15 |