

**Syllabus<sup>1</sup> for ESCI 4440**  
**Science Teaching Methods in the Middle Grades: Physical Science**  
**Spring 2007**

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Office Hours: By Appointment

(I will typically be in Aderhold all day Monday and Wednesday.)

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*I BELIEVE THIS PERSPECTIVE SHOULD GUIDE OUR WORK AS EDUCATORS:*

***All students** are worthwhile, capable, and possess a diversity of talents, no matter how hidden or absent they seem to be. Our job as teachers is to help ALL students experience success, develop their talents, and learn to be productive citizens. If something is not working, we should assume we need to try something different rather than assuming that the student did not fulfill his or her duty. Our job is to teach: If students are not learning, then we need to modify our approach rather than blaming students. Maintaining this perspective takes immense work, incredible vision, unflinching perseverance, and collaboration with others!*

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**Class Meeting Days, Times and Primary Location:**

Mondays & Wednesdays: 10:10 a.m. - 11:40 a.m.

Location: Room 213, Aderhold Hall

**My Vision for This Course:** Welcome to an exciting semester of learning about teaching middle school science! I intend for you to participate in various activities and conversations throughout this course that further your understanding of science teaching and learning and expand your vision of yourself as a middle school science teacher. I believe we can best accomplish these goals, and that you will be better prepared to be a classroom teacher, if we work together and collaborate as we learn. Although I have more experience teaching middle school science than you all, I do not want you to assume you have little to offer and take a passive, sponge-like role in class. You are about ready to become middle school science teachers. You will be responsible for making decisions that impact students' lives, for assessing whether students are learning and understanding what you intend them to, for interacting with parents as "the professional" who is knowledgeable about their child's learning, and for managing all the busywork that goes along with teaching.

In order for you to make positive strides in this direction I believe I must design learning in ways that simulate the level of professionalism, thought, energy, and responsibility that will

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<sup>1</sup> The course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary.

expected of you as a teacher. How can we accomplish this in a university course? At *least* the following two answers come to mind:

- i. **I** must design learning opportunities that encourage you to grapple with issues of teaching middle school science within a relevant, real-world context. In other words, you must have as many opportunities as possible to work with students in various capacities rather than theorizing abstractly about students. **You** must make every effort in your work with students to reflect on your work, students' learning and understanding, and students' responses to your work together, to make decisions you believe to be the best for the students, and to take full responsibility (as a teacher, not as a student) for your work with students.
- ii. **I** must be willing to collaborate with you rather than assume a more traditional, authoritative role as teacher. **I** must value your input, ideas, and decisions as integral components of this course. **You** must be willing to question what is going on in class, respectfully of course, and begin thinking of yourselves as professionals capable of making real decisions that influence students and colleagues. **You** must share your input and ideas as well as think deeply about the decisions you make.

I believe your willingness and ability to make thoughtful decisions, care about and believe in students' potential for success, be responsible for your learning, challenge the ideas of authority figures, colleagues, and the system in which we as teachers operate will help you continue in this role once you become a teacher. The success of our educational system hinges on your ability to think critically, question the status quo, and generate viable, innovative solutions to complex problems! Your voice is critical in this course - please help me facilitate class in a way that values this voice.

### **Broad Questions That Will Guide This Course:**

- \* What is science? What is the purpose of teaching science in school? Is our current approach to teaching science helping us achieve the vision you have for middle school science teaching?*
- \*How do students come to understand ideas in science? How can we, as teachers, get a handle on student understanding?*
- \*What classroom conditions facilitate students' science learning in middle school? How can teachers create such conditions?*
- \*What vision do you have for yourself as a future middle school science teacher?*
- \*In what ways can science instruction be designed to encourage students to take an active and productive role in understanding science in their community and in making decisions about science in their community?*

**Purposes:** I have designed this course to help you:

- start making decisions about teaching and learning;
- collaborate with your colleagues and myself in designing science learning opportunities for students and parents in various communities;
- clarify and refine your beliefs about teaching and learning in middle grades science;

- become aware of students' ideas in science and how those ideas influence their learning;
- learn, practice, and reflect upon teaching strategies that are commensurate with research on how middle grades students learn science;
- understand and design ways of assessing student learning in science;
- gain sensitivity to the needs of diverse learners and design instruction intended to the address these needs;
- begin developing you own repertoire of resources for teaching middle school science; and
- challenge the status quo and ask difficult questions about schools and science instruction in middle schools.

**Course Topics:** We will explore the following topics this semester:

- Nature of science and scientific knowledge,
- Inquiry in science and in the science classroom,
- Children's ideas and explanations in science,
- Approaches that promote success for a diversity (multiple intelligences, multi-racial/ethnic students, multiple ability levels and interests, etc.) of learners,
- Assessing children's learning in science (both formatively & summatively; traditionally & alternatively),
- Integrating science with other school subjects,
- Science, technology, society, and the environment (STSE),
- Science process skills, habits of mind, content standards (national and state [current & previous]),
- Learning Focused Schools,
- Design technology,
- Proactive classroom management in science classrooms,
- The role of homework in science classrooms,
- Various methods and techniques that facilitate critical thinking, high-level learning, and align well with science instruction.

**Policies:** These policies are subject to my discretion as well as your ideas about what is fair and professional. My goal is not to impose a dictatorial set of rules, but to give you a general overview of what I believe professionalism in this class should look like. These policies are not set in stone. We will discuss them on the first day of class and make modifications based on your ideas as well as mine. Circumstances vary by individual and I will take these into consideration in our work together. However, I have very high standards and I plan to uphold them in our work together.

Class Participation is a vital component of this course. If you are not in class, you are unable to participate in course activities. It is also important that you arrive on time and are ready to begin. Class will begin on time. In addition, I expect you to be actively involved in class.

- *Tardies & Absences.* You are expected to be present for every class meeting. Two absences (2 tardies are equivalent to 1 absence) will result in lowering your final grade by one letter. If at all possible, please notify me before class if you will be unable to attend.

If I cannot be reached in person or by phone, you should leave a message with the secretary in the Department of Mathematic and Science Education (706.542-1763). If you miss more than THREE classes for any reason, you may be withdrawn from the course.

- ***Make-Up Work:*** All work missed during any absence must be made up. Because much of the work we do during class will be activity- and discussion-based, I will usually provide students who are absent with a written alternative assignment that addresses topics emphasized in class on the day the student was absent. It is the responsibility of the student to contact me regarding content missed in class. Students with absences who do not contact me for make-up work or who do not complete the assigned make-up work will receive no participation credit for the missed class. Please contact me via e-mail concerning make-up work.

***Cell Phones:*** Prior to the beginning of each class, please remember to turn off your cell phone, or place it in the "vibrate" or "ringer off" mode.

***Assignments and Grading:*** Assignments are due at the **beginning** of class. Assignments not completed by the beginning of class will be considered late. I will deduct 15% per day from the grade on a late assignment. Late assignments will not be accepted more than 3 days after the initial due date. Thus, if an assignment is due Friday, the last day I will accept the assignment for partial credit is Monday morning at the start of class. Assignments that are submitted electronically must be submitted prior to class in order to receive full credit. The grading scale for this course is as follows:

93-100 A  
90-92 A-  
87-89 B+  
83-86 B  
80-82 B-  
77-79 C+  
73-76 C  
70-72 C-  
etc...

The assignments for this course will include the following. You will receive or help construct rubrics for those assignments that do not currently include specific grading criteria. You will receive a copy of these rubrics or grading criteria PRIOR to completing the assignment.

- ***Written Assignments (throughout semester)*** (10% of total grade - Due throughout the semester): You will be asked to complete various written assignments during the semester. These assignments may include: reflections about readings, activity or demonstration write-ups, summaries of key concepts, your ideas or thoughts about questions we address in class, etc. These assignments will all be graded using a 3,2,1,0 grading scale. I have posted a rubric with more specific details on WebCT. Your scores on written assignments

will be averaged in order to generate your final score in this category.

- To earn a 3 your response must be excellent (thoughtful, thorough, clearly explained, your ideas are supported with examples, free of grammatical errors, all directions were followed in submitting assignment)
  - To earn a 2 your response must be fair/good (1 or 2 of the criteria outlined above were not met; all of the rest were)
  - A score of 1 indicates your response needs improvement (only 1 or 2 of the criteria outlined above were met)
  - A score of 0 indicates you did not submit a response.
- **Analysis of Standard for Final Project (10% of total grade - DUE 2/7/07 before class)**: You will be working with one GPS substandard throughout this semester. This substandard will serve as the basis for work you do to help the class create a middle school physical science portfolio. This assignment will be submitted as part of your final portfolio submission. However, you will complete it early in the semester so that it can guide your work on your portfolio section and in Dr. Scott's class. Your analysis of the standard will be both an individual and a collaborative effort. Initially you will analyze your own substandard. Ultimately, you will collaborate with your peers to produce an analysis of the entire standard (including all substandards). When you collaborate to analyze the entire standard you will include your individual analysis of the substandard as well as some additional components that you will work with your group to generate. Both components of this assignment are described on the assignment sheets attached to this syllabus.
  - **Taliaferro Heart Full of Science Service Learning Opportunity**: This assignment will have multiple components that you will complete early in the semester.
    - ~~Tapping Into Students' Interests and Habits (10% of total grade - DUE 1/22/07 at the end of class - we will work on this in class for 1 ½ days)~~: In this assignment you and a partner will create a communication tool that contains both visual and written aspects. You will send this tool to a middle school class in Taliaferro County. This communication piece will have two purposes: 1. It will illustrate and explain to the students your nutritional habits, your exercise habits, and/or other ways in which health is related to your daily life. 2. It will serve as a model for students who respond to your communication tool. The way in which you construct your communication tool should be done in a way that students without access to computers or other expensive resources can construct a similar communication tool in which they depict their own health habits. The goal of this communication tool is NOT to demonstrate all of your best health habits, but to show students those health habits that are really part of your every day life. Ultimately, we will be using the information we gain from students about health habits in their lives to design the activities for a family science night at Taliaferro County School.
    - Activity for Heart Full of Science Night in Taliaferro County (20% of total grade

- **DUE 2/12/07 - presentation in class; bring all materials**): After the students at Taliaferro County Schools create and return their communication tools to you, you will work with a partner to come up with a short (15-20 minutes at most) Family Science Night Activity that addresses nutrition, exercise, and other health habits that are relevant to the students at the school. This activity should be something in which participants actively engage. It should not be a 10-15 minute talk by you and your partner. In addition, students of various ages as well as other community members (adults and very small children) will be participating in this activity. Thus, the activity should be something in which people of all engages can participate fairly well. You will spend 2 days planning this activity in class with your partner.

Afterwards, we will have a day in which other students from the university as well as all the members of the class participate in your activity. This will allow you an opportunity to get feedback from others and make modifications to your activity before implementing it at Taliaferro County School on February 15. The rubric for this assignment is posted on WebCT.

- Participation at Heart Full of Science Night (5% of total grade - credit earned if student is in attendance).
  
- **Family Science Night at Whitehead Elementary School: (10% of final grade - credit earned if student is in attendance)**. You will work closely with one fourth grade student at Whitehead Elementary School five times throughout the semester. You will be designing an activity for a Family Science Night focused on the elementary GPS. Ultimately, you will help the student learn the science concepts that are part of your activity and help them learn how to teach the science to others and facilitate others' learning during FSN. The activity you use with your fourth grader may be one you include in your final resource file.
  
- **Physical Science Resource File (40% of final grade - Due 5/4/07 by 8:00 a.m.)**: The intent of this assignment is to work as a class to develop a resource file in which we develop lesson plans, activating strategies, productive questions, inquiry-oriented activities, and formative and summative assessments that align with all of the physical science Georgia Performance Standards. Although you will only be responsible for developing one portion of this resource file, everyone in the class will do the same for a different GPS. Ultimately, you will walk away with a resource file that addresses all of the physical science GPS. I believe this will be immensely helpful if you end up teaching physical science in middle or elementary school. I will provide you with further instructions on this assignment later in the semester. However, one important note is that all parts of your resource file must be electronic so that each member of the class can have an e-copy of everyone else's work at the end of the semester.
  
- **Class Participation**: An effective way to get the most out of this course is to actively engage in what's going on in class and in the field. Your insights, innovations, critical questions, and concerns are critical to the success of this class. Thus, a portion of your

grade will be based on your participation. I will let you know your participation score mid-way through the semester **(5% of final grade)**

**Keep in mind that you choose the quality of the work submitted and the quality of your participation in class. A's will be earned by those products that exhibit exemplary quality rather than simply completion of the assignment.**

**Academic Honesty:** All students are encouraged to read and understand "A Culture of Honesty (the UGA Academic Honesty Policy) found at <http://www.uga.edu/~ovpi/honesty/ah.pdf>. 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. Instructors are committed to the principles of academic honesty and subscribe to the UGA Academic Honesty Policy guidelines for the definition and processes of academic integrity. All students are subject to these academic guidelines. Instructors have and will initiate academic dishonesty proceedings if in their courses they find reasonable cause to do so.