EDCI 675: Learning to Teach and Learn Science

Fall 2012- Monday 5:30-8:30 Laurel College Center Room 313

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Office Hours: by appointment

Course Overview

This course is designed as the second in a sequence for prospective science educators in the Masters Certification Program. It comes in the fall semester of the year-long placement in schools, while some of you are observing and assisting in middle and secondary school classes and some are beginning to teach. During this course, we will focus attention on students’ science learning and make the transition to thinking about the relationships and interactions between student learning and instructional strategies.

Learning Outcomes

By the end of the course, candidates will show:

• basic understanding of research on science teaching and how it may affect student learning, specifically with respect to conceptual knowledge, reasoning abilities and inquiry, epistemologies, and learning contexts; (InTASC\(^1\) 1, 2; EC\(^2\) 1, 2, 7; NSTA\(^3\) 1, 2, 3, 4, 7)

• familiarity with instructional strategies of attending, assessing, and responding to student thinking; (InTASC 6, 8; EC 7; NSTA 5, 8)

• abilities to plan instruction, based on the materials, curriculum, and students in the classes they are teaching or observing; (InTASC 1, 2, 3, 4, 5, 7; EC 5, 7; NSTA 5, 6)

• abilities to identify, interpret, and design appropriate responses to student thinking as evident in specific case studies of interviews (focus groups), classroom observations, and first experiences teaching; (InTASC 6, 8; EC 4, 5; NSTA 5, 8)

Goals

• To engage in thoughtful, critical discussion of research on learning and teaching in science

\(^1\) Interstate New Teachers Assessment and Support Consortium (InTASC) Standards
\(^2\) Emerging Commitments of the Conceptual Framework of the College of Education
\(^3\) National Science Teachers Association Standards
• To analyze student thinking in ways we began in EDCI 411, as evidenced in interviews, samples of written work, and classroom video.
• To develop and critically reflect upon potential affordances and limitations of instructional and assessment strategies, tools, and curricula in the classes you are teaching or observing, with particular focus on supporting student thinking.
• To consider issues of equity in science learning, and approaches to working with students with varied needs.
• To plan, implement, and reflect on classroom instruction.

In EDCI 411, you began to consider research on science learning. We will briefly review ideas from that course, and then continue from there to focus on the craft of teaching.

Assignments and Requirements

During this course, you are expected to:

• attend and participate in seminar discussions
• read approximately 30-50 pages per week
• conduct one student focus group discussion, with 4-6 pages of written analysis;
• conduct one observation of classroom learning and instruction, with 4-6 pages of written analysis;
• plan, implement, and reflect on two (2) science lessons, with 4-6 pages of analysis;
• complete a unit plan for a unit that you will teach next semester. 4-6 pages
• read, observe, and comment on other students’ work.

This syllabus is a fluid document that will be revised and modified as we move through the course based on student needs, interests, and more generally what is happening in class. You will be kept informed of all revisions of the syllabus.

Specific Assignments (More detail will follow throughout the semester)

** Adhere to the following convention for naming your assignments:
   Last name.AssignmentName.EDCI675.doc

**Focus Group (InTASC 1, 4, 5; EC 1, 4, 6, 7, NSTA 3, 4):**
This assignment is similar to the interview assignment from EDCI 411. You will pose a science question (e.g. “Where does all the weight come from, when an acorn grows into a tree?” or “If I leave a wet towel on a rack, and it dries, what happens to the water?” or you might consider posing the same question you did in the student interview from EDCI 411) to middle or high school students and interview no more than a group of 4 students about their thinking. The purposes of the assignment are (1) to develop abilities for eliciting and listening to student reasoning, and (2) to gain insight into that reasoning, into what and how students know and think about natural phenomena.

Classroom observation and analysis (InTASC 1, 4; EC 4, 7, NSTA 1, 2, 3, 10):
This assignment asks you to observe a lesson at your school placement, with special attention to students’ ideas and how the teacher responds (or doesn’t respond) to those
ideas and/or creates opportunities for student thinking. Your observation will include an analysis of lesson plans and student work (or video) collected during the observation.

**Lesson planning and reflection:** (InTASC 1-8; EC 1, 2, 4, 5, 6, 7, NSTA 1, 5, 8):
This assignment asks you to plan lessons that you will be teaching as part of your fall experience in schools. You will submit, discuss, and revise your plans, and then teach the lessons, finally preparing 4-6 pages of reflection on what took place, based on evidence from students’ written or recorded work.

**Unit plan:** (InTASC 1-8; EC 1, 2, 4, 5, 6, 7, NSTA 1-8):
Building on your experience analyzing curriculum in EDCI 411, and your experience planning and teaching lessons, you will prepare a unit plan designed to cover a coherent unit of instruction (ideally one you will be teaching in the Spring) containing a variety of opportunities for students to use scientific knowledge, reason scientifically, and participate in scientific practices and discourse.

**Expectations and Grading**

*Student Expectations:*
You are expected to attend all classes, complete assigned readings before the class period in which they are to be discussed, participate actively and thoughtfully in class discussions, complete required writing assignments, and follow university regulations regarding academic and behavioral integrity.

Your attendance is crucial to your success in this class due to its discussion-based format. Absences will result in a reduced participation and professionalism grade. You may have one absence without any questions asked. Beyond that, your grade will be reduced. If you know you will be absent for a religious observance, let me know well in advance. If extenuating circumstances arise, let me know as soon as possible.

**Late work** will result in a reduced grade. For each day an assignment is late, half a letter grade will be deducted from the assignment. Extensions will occasionally be granted for extenuating circumstances with documentation and appropriate discussion with me.

If at any time you feel that it would be more beneficial to your education to do something differently in the course, please speak to me. If you experience difficulty in this course for any reason, please don’t hesitate to consult with me.

**Grades:**
Each assignment is allocated a certain percentage of your grade, as indicated below.

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Class participation</td>
<td>15%</td>
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<tr>
<td>Focus group</td>
<td>15%</td>
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<tr>
<td>Observation and Analysis</td>
<td>15%</td>
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<tr>
<td>2 Lesson plans with analysis</td>
<td>40% (@20%)</td>
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<tr>
<td>Unit plan</td>
<td>15%</td>
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Grading Scale

A+ (100)  A (93 to 99)  A- (90 to 92)
B+ (87 to 89)  B (83 to 86)  B- (80 to 82)
C+ (77 to 79)  C (73 to 76)  C- (70 to 72)

Readings:

There is no textbook for this course. Readings will draw from the science and general education literature. Articles will be emailed in advance, placed on LiveText or handed out in class. This is a tentative list that may be modified.


NRC (2007). *Taking science to school: Learning and teaching science in grades K-8*. Washington, DC, Committee on Science Learning, Kindergarten through Eighth Grade.


Tentative Calendar: Fall 2012

Each course meeting will include the discussion of the assigned reading, which everyone is expected to read in advance carefully and critically. We will also: do
science; analyze curricula, assessment materials, and examples of student work from school placements; watch and discuss classroom video; share and critique examples of our work. The calendar will most likely be changed as the semester proceeds.

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<thead>
<tr>
<th>Date</th>
<th>Topic and Assignments</th>
<th>Readings</th>
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<tbody>
<tr>
<td>9/10</td>
<td>Attending to student thinking</td>
<td>Levin, Grant, &amp; Hammer, 2012</td>
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<td>Focus group interview assigned</td>
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<tr>
<td>9/17</td>
<td>No class—Rosh Hashanah</td>
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<td></td>
<td>Focus group interview due</td>
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<td>Observation and analysis assigned</td>
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<td>10/8</td>
<td>Nature of Science/Student Epistemologies</td>
<td>Hogan &amp; Maglienti (2001)</td>
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<td>Observation and analysis due</td>
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<td>First lesson plan assigned</td>
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<td>10/15</td>
<td>Argumentation</td>
<td>Berland &amp; Hammer (2012)</td>
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<td>10/22</td>
<td>Metacognition</td>
<td>Davis (2003)</td>
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<td>10/29</td>
<td>Curriculum</td>
<td>Taking Science to School (2007, selections)</td>
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<td>First lesson plan analysis due</td>
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<td>Second lesson plan assigned</td>
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<td>Second lesson plan analysis due</td>
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<td>11/5</td>
<td>Assessment</td>
<td>Black &amp; William (1998)</td>
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<td>11/12</td>
<td>Technology and media</td>
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<td>11/19</td>
<td>Under-represented students</td>
<td>Seiler (2001)</td>
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<td>Second lesson plan analysis due</td>
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<td>11/26</td>
<td>Students with special needs</td>
<td>Scruggs &amp; Mastropieri (2007)</td>
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<td>12/3</td>
<td>English Language Learners</td>
<td>Warren et al., (2001)</td>
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<td>Academic language</td>
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<td>TPAC</td>
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<td>Unit Plan due</td>
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Course Evaluations

As a member of the UMD academic community, you as a student an important responsibility to submit your course evaluations each term through CourseEvalUM in order to help faculty and administrators improve teaching and learning at Maryland. The link through which you can access the evaluation system is: www.courseevalum.umd.edu. Once you submit your electronic evaluations, you can access all posted results via Testudo under CourseEvalUM Reporting. More information on the electronic evaluation system is available at:


Individual Needs Accommodation

In compliance with the Americans with Disabilities Act (ADA), I would like to work with you if you have a documented disability that is relevant to your work in this course. In order to ascertain what accommodations may need to be provided, students with disabilities should inform me of their needs at the beginning of the semester. I will then consult with Disability Support Services (314-7682). DSS will make arrangements with the student to determine and implement appropriate academic accommodations.

Learning Assistance Service

If you are experiencing difficulties in keeping up with the academic demands of this course, contact the Learning Assistance Service, 2202 Shoemaker Building, 301-314-7693. Their educational counselors can help with time management, reading, math learning skills, note-taking and exam preparation skills. All their services are free to UMD students.

University Honor Code

The University of Maryland, College Park has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. The Code prohibits students from cheating on exams, plagiarizing papers, submitting the same paper for credit in two courses without authorization, buying papers, submitting fraudulent documents, and forging signatures. As a student you are responsible for upholding these standards for this course. Violations of the Academic Integrity Code will not be treated lightly, and disciplinary actions will be taken should such violations occur. Please see me if you have any questions about the academic violations described in the Code in general or as they relate to particular requirements for this course. For more information on the Code of Academic Integrity or the Student Honor Council, please visit http://www.studenthonorcouncil.umd.edu/whatis.html.