EDCI 4210W
Instruction and Curriculum the Secondary School - Mathematics
In conjunction with
EGEN 4100
Methods of Teaching - Mathematics
Fall 2010

Instructors: Megan Staples and Sandy Ferrari
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Class Time: Mondays, 1:00 – 3:30 pm  Location: EDCI 4210W: Gentry 319
                                            Wednesdays, 3:00 – 5:00 pm  EGEN 4100: Koons 301

COURSE OVERVIEW

Course Description
This course is designed for students who are planning to be secondary mathematics teachers in our current educational and societal context. This course will offer opportunities to consider practical, classroom-based issues in conjunction with theoretical and conceptual frameworks that will guide your decision-making and instructional design in your teaching. The course goals are listed below. Activities, readings, discussions and other experiences in this course are designed to promote these goals.

Objectives
- To examine your assumptions, beliefs, and values about the secondary mathematics curriculum, instruction, and assessment.
- To study current approaches to the teaching and learning of secondary school mathematics with respect to issues of pedagogy, curriculum, learning theory, assessment and equity.
  - To investigate strategies for facilitating rich classroom interactions and activities that engage a diverse group of students in the learning of mathematics.
  - To broaden your repertoire of practical teaching strategies and activities, including the use of technology and manipulatives to enhance students’ understanding.
  - To develop strategies and sensitivities towards supporting a wide range of learners who vary in prior attainment, academic orientation, linguistic resources, etc.
- To examine current national initiatives (e.g., NCTM Standards) and their impact on math education and the teaching and learning of mathematics, including both content and process standards.
- To begin to develop as a professional educator.
- To continue learning mathematics, especially in ways that promote inquiry and investigation.
- To meet the university requirements for a W course.

This course aligns with the NCATE Standards and NCTM SPA (Specialty Program Area) Standards, specifically, Standard 4: Knowledge of Mathematical Connections, Standard 6: Knowledge of Technology, Standard 7: Dispositions, and Standard 8: Pedagogy. Two key assignments that address several of these standards are the Microteaching Technology assignment and the Unit Plan assignment.
Both of these assignments need to be posted to TaskStream. The course also aligns with the Neag School of Education conceptual framework with three overarching themes: Learning, Leading and Lighting the Way as teacher education candidates extend their professional knowledge base and examine their role in the education of children and promoting achievement for all students.

### COURSE INFORMATION

#### Required Materials and Text:


#### 2. NCTM Membership

- The National Council of Teachers of Mathematics is the professional association for mathematics teachers. (The local affiliate is ATOMIC.) Part of becoming a professional educator is participating in, and learning from, such professional organizations. A course requirement is to become a student member of NCTM. This allows you access to the *NCTM Principles and Standards (2000)*, their Bulletins, member only resources, and a profession journal for middle *Mathematics Teaching in the Middle School* or high school teachers (*The Mathematics Teacher*). For a list of all the benefits of membership, see [http://www.nctm.org/membership](http://www.nctm.org/membership) You can enroll online, but you will need to first create an account (which let’s you then purchase things, such as memberships). Membership is $39. So they can verify you are a student, you need to list your professor and email (Megan Staples, megan.staples@uconn.edu). You can also list me as the referring member. **Member number 3878345.** Your membership also gets you discounts on purchases. For example, if you would like to get a hardcopy of the Standards, with a membership, there is a 20% discount. I strongly encourage purchasing a hardcopy.

#### 3. Please have a 3-ring binder for storing and organizing these materials. You will regularly be assigned additional readings drawn from journal articles, book chapters, online resources, and other mathematics education materials. Selected articles will be distributed in class or posted on the class webpage, or you will be asked to peruse certain journals for articles on specific topics. Please always bring a hardcopy of an assigned reading to class, unless otherwise noted.

#### 4. TI-84 graphing calculator (optional). I can also issue you one for the semester or year. (You may also find your school has one you can use.)

### COURSE REQUIREMENTS and MAJOR ASSIGNMENTS

The following comprise the major assignments of the course. Complete instructions and evaluation criteria will be handed out during class.

#### Site visits to Schools

Your clinic placement will take you into schools 6 hours per week. Periodically, we will meet at a school – to have a practicing teacher talk with us, see demonstrations of technology, or observe some lesson(s) as a group. These will be announced in advance and we will organize transportation as a group. For meetings that extend beyond class time, you may count these towards your clinic hours. Please appropriately communicate with your clinic instructor about any variation in your regularly scheduled times.

#### Class Participation, Readings and Class Work Assignments

You are required to attend each class meeting and actively participate in class, complete reading assignments, and hand in assignments and projects on time. Your attendance for each class meeting is critical. The course is designed so that significant learning experiences occur during class time. Each individual’s participation in the activities and discussions create the learning environment. Thus, your presence and participation are not only central to your own learning, but to that of your classmates.
Each week there will be assigned readings. **Please always bring a hardcopy of an assigned reading to class, unless otherwise noted.** Often, you will be given guiding questions for the readings. Please bring your responses to class and be prepared for a discussion. Sometimes, you will be asked to respond to a question related to the reading on WebCT prior to our next meeting, or to continue a class discussion on WebCT. You will be given further guidelines for these online discussions. Finally, class preparation may also entail other tasks such as gathering example lessons or analyzing student work.

**Inquiry brief – professional resources**

Questions about teaching are not countable, nor are the number of articles, problem sets, and web resources available to you. For this assignment, you will identify a question of interest to you about teaching mathematics, and develop a tentative answer or set of strategies to address the question by reading articles or finding other resources on the web addressing the topic. You must use 2-3 resources (one resource may be another educator with particular experience in relation to your question). One goal is to increase your knowledge about and proficiency with various resources, as in the future, many questions will arise in relation to practice. The second goal is to begin to tackle some interesting questions about teaching. Write-ups will be posted to WebCT as a set of resources for the group.

**Lesson Plan Assignments** (these comprise 2 documents: Lesson Plan and LP Elaboration & Analysis)

**Algorithm with Connections** (draft due Monday, September 21; meet with me Tuesday, September 22; final due no later than Monday, September 28)

**Concept/Discovery** (draft due Monday, October 5; meet with me Wednesday, October 7; final due no later than Monday, October 12)

Each Lesson Plan Assignment targets a distinct type of learning objective and comprises two parts: the **lesson plan** (including objectives, launch, procedures, etc.) and a **lesson plan elaboration and analysis**. Please note that a lesson plan is an artifact. It is a product of your thinking and a guide/set of reminders for your teaching. More important is the kind of thinking and preparation that takes place to produce that artifact, which is done as you design and reflect on how a particular lesson will play out. The purpose of the LP Elaboration and Analysis is to document your thinking in relation to the lesson and the mathematics of the lesson. When you student teach, you will only write the lesson plans, although you should go through the thinking entailed in the LP Elaboration and Analysis. For Lesson Plan Assignments, however, you write both components.

**Leading a mathematical activity (micro-teaching)**

During one session, you will lead the class in a mathematical activity with a partner. These lessons will incorporate and make effective use of various manipulatives or other technologies. You will plan and teach these lessons in pairs. Ten days prior to your micro-teaching date, you will submit a draft of the lesson plan (only the lesson plan—no elaboration and analysis needed). In addition, you will include a 11/2 - 2-page write up with an explanation of the role of technology in your lesson along with a discussion about the technology you used more broadly and how it allows you to address certain mathematical concepts or objectives that you could not otherwise accomplish without the technology. (Example of what not to do: Use sketchpad to draw a single diagram which students then print out and use to solve a problem.) We will then meet and discuss it.

The products of this assignment will be a) implementation of the lesson that intelligently incorporates technology; b) a lesson plan that intelligently incorporates technology and c) a reflection and proposed revision of the lesson.

**Analysis – Discourse that Supports Students’ Higher-Order Thinking**

In this assignment, you analyze a segment of classroom discourse, focusing on how the teacher supports (or not) students’ participation in higher order thinking. Does the teacher make space for student thinking? How does the teacher respond to student thinking? How does the teacher sustain higher level thinking, particularly when students find it challenging. More details will be handed out in class.
Unit Plan Assignment

Creating coherence across multiple lessons, a complete unit, and a course requires careful attention to connections among what can sometimes be seen as discrete lessons with individual objectives. To help you think more broadly about structuring students’ educational experiences, you will design a 1.5- to 3-week unit on a topic in the middle school or high school mathematics curriculum (grades 7–12). The core of the assignment is a series of linked lessons and related assessments.

The unit plan will be created with a partner. Please use this assignment to practice lesson design under some of the conditions you will face in your teaching life (finding resources, learning new content and distilling what, how, and why you might teach this topic to a particular group of students). The main components of the assignment are listed here. The full assignment will be given in class.

- An overview of the unit comprising the following components: a rationale justifying the importance of this topic in the curriculum; the unit’s overarching objectives/questions; descriptions of how the unit is aligned with NCTM Standards and/or the State of Connecticut Mathematics Frameworks; and calendar/timeline.
- 4-5 sequential lesson plans including all supplementary information, handouts, lists of needed materials, etc. At least one lesson must use groupwork with a groupworthy task. At least one lesson must be designed to specifically attend to language and ELLs. Across the set of lessons, there must be a healthy focus on developing students’ understanding of your topic and not merely procedural fluency. An analysis of the lessons is also required. (Format will be similar to the LP Elaboration & Analysis.)
- At least two assessments including one standard paper-and-pencil test and one alternate form of assessment that overlap in the objectives they assess. This component will be accompanied by scoring rubrics and a rationale that discusses how the assessments provide insight into the degree to which the learning objectives have been met.

Meeting the W Requirement

A minimum of 15 pages of writing that has been through the revision process is required for this and all W courses. The W component of the course is central to the mission of the course, using writing as a tool to facilitate thinking, reflection and ultimately, learning. You cannot pass the course without passing the W component. Writing is a critical skill for teachers. You are constantly asked to communicate your thinking with respect to mathematics teaching and learning both written and oral forms. In addition, enhancing the clarity and quality of your written analyses of teaching and learning is both a means to sharpening your analytic skills and evidence of greater proficiency with analytic thinking. One resource to take advantage of is the UConn Writing Center. Visit http://writingcenter.uconn.edu/.

EVALUATION

I expect that everyone will do well in this course. Guidelines and criteria for evaluation will accompany each assignment and be handed out during class. All assignments will be evaluated in part on your ability to organize and communicate your ideas. Assignments are due at the beginning of class unless otherwise specified. Do not worry if you are asked to revise or rewrite an assignment. When the goal is mastery of material (and not just “good enough”), revising and rewriting are common practices.

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<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Class Participation</td>
<td>15%</td>
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<tr>
<td>Readings, Weekly Assignments and WebCT posts</td>
<td>15%</td>
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<tr>
<td>Inquiry brief - professional resources</td>
<td>5%</td>
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<tr>
<td>Individual lesson plans (10% each)</td>
<td>20%</td>
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</table>
Leading a mathematical activity (microteaching) 15%
Analysis – Discourse the supports H.O.T. 5%
Unit plan 25%

Grading Scale

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<tr>
<th>Point Range</th>
<th>Grade</th>
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<tbody>
<tr>
<td>93.5 to 100</td>
<td>A</td>
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<tr>
<td>89.5 to 93.4</td>
<td>A-</td>
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<tr>
<td>86.5 to 89.4</td>
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<tr>
<td>83.5 to 86.4</td>
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<tr>
<td>79.5 to 83.4</td>
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<tr>
<td>75.5 to 79.4</td>
<td>C+</td>
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<tr>
<td>71.5 to 75.4</td>
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COURSE POLICIES

ATTENDANCE
If for some reason you must miss a class, please let me know as far in advance as possible. You are responsible for having a classmate share notes with you, collect any relevant handouts, etc., and contacting me to “make up” all activities. Multiple absences will be handled on a case-by-case basis.

LATE ASSIGNMENTS
Assignments submitted late resulting from an excused absence or circumstances discussed and approved in advance will be accepted without penalty. For other late assignments, five percentage points (equivalent of ½ grade) will be deducted for each day late. No late work will be accepted after Wednesday, December 9th at noon.

INCOMPLETES
Department policy strongly discourages incompletes. Only in extreme circumstances (most often involving one’s health or the health of a family member) will an incomplete be considered. If the need to consider this option arises, please contact me as soon as possible.

SPECIAL NEEDS
Every effort is made to accommodate students with documented learning differences. Please see me during the first week of class to discuss any necessary adaptations and accommodations for the course. The relevant policies can be found at http://www.csd.uconn.edu/accesssv.html. Students with disabilities must be registered with the UConn Center for Students with Disabilities in order for appropriate classroom accommodations to be provided.

ACADEMIC HONESTY AND INTEGRITY
All students – particularly those who are pursuing a profession in teaching – are expected to pursue their own education with a commitment to high standards and honesty, and with respect for themselves, others, and the rules that govern academic institutions and intellectual inquiry. All submitted work must be a product of the student’s thinking and creation and with appropriate credit and references given in the case of collaboration or use of other sources (e.g., websites, curricular materials). Work submitted that does not meet this criterion will receive no credit and the student may be subject to administrative action or disciplinary penalties. For a detailed discussion, please refer to the University Regulations Handbook. Please refamiliarize yourself with the following University of Connecticut academic integrity policy:
“A fundamental tenet of all educational institutions is academic honesty; academic work depends upon respect for and acknowledgement of the research and ideas of others. Misrepresenting someone else's work as one's own is a serious offense in any academic setting and it will not be condoned.

Academic misconduct includes, but is not limited to, providing or receiving assistance in a manner not authorized by the instructor in the creation of work to be submitted for academic evaluation (e.g. papers, projects, and examinations); any attempt to influence improperly (e.g. bribery, threats) any member of the faculty, staff, or administration of the University in any matter pertaining to academics or research; presenting, as one's own, the ideas or words of another for academic evaluation; doing unauthorized academic work for which another person will receive credit or be evaluated; and presenting the same or substantially the same papers or projects in two or more courses without the explicit permission of the instructors involved.

A student who knowingly assists another student in committing an act of academic misconduct shall be equally accountable for the violation, and shall be subject to the sanctions and other remedies described in The Student Code.”

For additional information see: http://www.dosa.uconn.edu/student_code.cfm