

**Spring 2009**  
**EDCI 426/426J: Teaching Mathematics in the Middle School**  
**Felix Haas Hall G066**  
January 12 - February 22, 2009  
Wednesday 12:30 – 4:20 p.m.

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### **COURSE DESCRIPTION**

This course is designed for students who are planning to be secondary mathematics teachers. The activities in this course have been designed to meet the following goals:

1. To develop an understanding of students' thinking and the processes by which they come to learn mathematics and think mathematically.
2. To develop an understanding of teaching and learning environments through analyzing classroom interactions and the interplay among mathematics, classroom tasks, teacher moves, and students' ways of thinking and being.
3. To develop an understanding of the scope and significance of school mathematics through an examination of state and national standards and mathematics education research.
4. To develop professional attitudes and work habits and identify professional organizations and resources locally and nationally.
5. To continue learning mathematics, especially in ways that promote inquiry and investigation.

The philosophy driving this course is that teaching is highly complex activity, involving extensive knowledge and judgment. The activities, readings, and assignments in this course are designed to augment pre-service teachers' knowledge base for teaching and to foster the ability to see and analyze teaching in the classroom and make informed judgments with respect to organizing productive learning environments for mathematics students.

### **REQUIRED MEMBERSHIPS**

Student membership to National Council of Teachers of Mathematics (NCTM):

For information regarding a student e-membership and ability to apply online:  
<http://www.nctm.org/benefits-student.aspx>. Establishing yourself within this important organization is professionally beneficial and allows you to gain access to valuable resources. School administration likes their teachers to be connected to the professional organization in their content area. A student membership is half price and costs \$39 for a year and will allow you online access to *Principles and Standards for School Mathematics (PSSM)*. Additionally, you will be given online access to *The Mathematics Teacher* (the journal for high school mathematics teachers). If you would like to purchase a paper copy of the *PSSM* or any other of their resources, your membership will give you a 20% discount.

### **FIELD COMPONENT**

You will conduct a minimum of 12 hours (over a minimum of 6 visits) of observation in middle and/or high school mathematics classrooms. Your placement will be with your future cooperating teacher(s) for your student teaching placement. There is a journal entry that is required for each of the 6 visits. You will likely want to visit more frequently (and are encouraged to do so) to get to know your students, establish a relationship with your cooperating teacher and other colleagues, and to learn more about the curriculum, policies, and culture of the school.

## POLICIES

### ATTENDANCE

Your attendance to each class meeting is expected. You should contact the instructor as soon as possible if you become aware that you will be unable to attend a class session. In the event of a missed class, you are responsible for contacting the instructor to "make up" all activities. Unexcused absences will result in a 5% reduction of the total points for the course in addition to any late assignment penalties.

### LATE ASSIGNMENTS

It is your responsibility to make sure your assignments are submitted by the due date. Several assignments are to be submitted to your working portfolio on TaskStream. Other assignments will be submitted to Blackboard. *Late assignments are not accepted for full credit without the agreement of the instructor in advance.* Unless there are extenuating circumstances five percent of the total points for every 2 days late (e.g., 1 day is -5%, 2 days is -5%, 3 days is -10%, etc.) will be deducted from late assignments. No work will be accepted after Friday, February 20th unless prior arrangements have been made with the instructor. Assignments submitted late resulting from an excused absence will be accepted without penalty. The revised due date will be set by the instructor. After that date, late penalties apply as described.

### 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 explore this option arises, please see the instructor as soon as possible. *It is unlikely that you can take an incomplete and keep your student teaching reservation.*

### CAMPUS EMERGENCY

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances. Here are ways to get information about changes in *this* course: [janewton@purdue.edu](mailto:janewton@purdue.edu) or 269-214-0103.

### BEERING HALL EMERGENCY

Students are required to visit <http://www.education.purdue.edu/ODFD/resources.html> to review the response procedures for emergencies in Beering Hall. It is necessary that you review these directions within the first week of your Beering classes. If you have any questions see your instructor.

### ADAPTIVE PROGRAMS STATEMENT

Students with disabilities must be registered with Adaptive Programs in the Office of the Dean of Students before classroom accommodations can be provided. If you are eligible for academic accommodations because you have a documented disability that will impact your work in this class, please schedule an appointment with your instructor as soon as possible to discuss your needs.

### ACADEMIC DISHONESTY STATEMENT

Purdue prohibits "dishonesty in connection with any University activity. Cheating, plagiarism, or knowingly furnishing false information to the University are examples of dishonesty." [Part 5, Section III-B-2-a, University Regulations <<http://www.purdue.edu/univregs/>>] Furthermore, the University Senate has stipulated that "the commitment of acts of cheating, lying, and deceit in any of their diverse forms (such as the use of substitutes for taking examinations, the use of illegal cribs, plagiarism, and copying during examinations) is dishonest and must not be tolerated. Moreover, knowingly to aid and abet, directly or indirectly, other parties in committing dishonest acts is in itself dishonest." [University Senate Document 72-18, December 15, 1972] Work submitted that is not one's own may receive no credit and the student may be subject to administrative action or disciplinary penalties.

## PROFESSIONALISM

Prospective teachers are expected to demonstrate professionalism in their conduct at all times, particularly when a guest at a school or in a colleague's classroom. Teacher education students are asked to consider carefully their appearance/choice of clothing and the level of respect conveyed in interactions with teachers, students, other school personnel, and parents in all interactions and communications. *The School of Education's professional agreement will be passed out and discussed during class.*

### POINT DISTRIBUTION

Class Participation/Preparation	30 points
Field Observation Journals	30 points
Microteaching	30 points
School and Community	14 points
2 Lesson plans	72 points (2 x 36 points each)
Problem Collection	24 points
<b>TOTAL</b>	<b>200 points</b>

### GRADING SCALE

A+	97 - 100.0%
A	92 - 96.9%
A-	90 - 91.9%
B+	87 - 89.9%
B	82 - 86.9%
B-	80 - 81.9%
C+	77 - 79.9%
C	72 - 76.9%
C-	70 - 71.9%
D+	67 - 69.9%
D	62 - 66.9%
D-	60 - 61.9%
F	< 60%

#### **Class Participation/Preparation (30 points)**

- ⇒ *Reading Summaries:* Generally, there are readings for each class. After reading and prior to class, write a short summary identifying at least one key point and something you learned or question you have for each assigned reading in preparation for in class discussions. Please limit your summary to a page or less. Outline or bullet format is preferred. These summaries will be collected at the end of each class as they will help to guide your part in the class discussion. There will be times when a reading is not discussed, as we have a limited amount of time. In no way does this diminish the importance of the reading. These readings offer important ideas and information to you as a future teacher and provide a common basis for our class and our discussions.
- ⇒ *Participation in class activities and discussions*

#### **Field Observation Journal (30 points)**

During EDCI 426 you begin assembling your Gate D portfolio on TaskStream. A sample is provided for you at <http://www.taskstream.com/ts/mann11/GateDSamplePortfolio.html>. As part of your GATE D portfolio you are expected to keep a Field Observation Journal during the six weeks of EDCI 426.

Journal entries should be written, thoughtful, reflective responses to specified prompts. There are 6 journal prompts— one for each week. All journal responses should be well written and free of typos. Most topics can be adequately addressed within a page or two.

#### Journal Prompts

- ⇒ Week 1 (**Due January 23**): Introduce yourself to your cooperating teacher, visit your classroom and observe a class. What were your impressions of the class? What was the classroom environment like? What classroom management strategies did the teacher employ?
- ⇒ Week 2 (**Due January 30**): Focus on the mathematics of the lesson. What was the topic? What did the teacher assume the students knew? Did not know? Where were the students mathematically in their understanding at the beginning of the lesson? Where were they at the end? Provide evidence and use examples to support your claims.
- ⇒ Week 3 (**Due February 6**): For the lesson you observed, was the emphasis on conceptual understanding, procedural fluency (with or without connections), problem solving, or something else? Provide evidence for your claims. You want to think about (a) the task(s) given, (b) the teacher's questions (c) the answers students gave, and (d) the kinds of thinking expected of the students.
- ⇒ Week 4 (**Due February 9**): Observe any mathematics lesson. Think about and record the opportunities that were provided to develop language skills and an understanding of the language and symbols of mathematics. Note that the lesson you observed may not have had developing language and symbolic fluency as an explicit goal. Assume you had to teach a similar lesson to a group of students, many of whom perhaps are not fully fluent with English or who struggle with symbolic notation and meanings. How would you approach or adapt the lesson to support these learners?
- ⇒ Week 5 (**Due February 13**): This observation is more like an exploration. Ask three educators at your placement school if you can have a conversation with them about students on Individual Educational Plans (IEPs.) Learn about the school policies, how IEPs are structured, and the kinds of accommodations that are typical for students to receive (either in a given subject area or across classes). If possible review several IEPs and student cumulative folders (remember to protect student confidentiality). Record what you have learned, questions you would like to ask and what you would like to learn more about before or during your student teaching.
- ⇒ Week 6 (**Due February 20**): Given what you know about the classes you will take over, identify and describe three challenges you expect to face and describe two or three strategies you might use to effectively meet each of these challenges. Be specific! You may also choose to share this reflection with your university supervisor and/or cooperating teacher.

#### Microteaching (30 points) (Various due dates)

Using the Launch-Explore-Summarize teaching model\* you will launch an activity, with your classmates as your students. The lesson must be one where you are using a real world context to stimulate students' inquiry into some mathematical area. The initial problem or activity should connect mathematics with students' prior experiences or serve as a means to garner their interest for the mathematics they will explore. There are multiple goals for this activity to:

1. Provide practice in giving clear instructions, introducing and launching an activity or mathematical topic of problem;
2. Provide an opportunity to explore the expanse of "real world" problems and data available for classroom use;
3. Gain experience conceptualizing the trajectory of a lesson, starting with a "grabber" that is rich enough to allow you to develop the desired mathematics.

Your activity "launch" should take between 5 and 10 minutes, please plan accordingly.

\* <http://www.learner.org/channel/workshops/missinglink/pdf/tools1.pdf>

#### School and Community Report (14 points) (Due February 4)

Section II of your Gate D portfolio provides you the opportunity to describe the school and community that you have been placed in for your student teaching experience. For this assignment first meet with your principal or assistant principal, the school counselor, the math department chair, and your

cooperating teacher. During these meetings find out about the challenges facing the school, the challenges facing the students, support from the community, support from the parents, the vision or mission statement for the school, etc. If possible, attend a PTO/PTA meeting or talk with some parents. Review the faculty and student handbooks. Find out what the mission statement or philosophy is for your school. Spend some time on your school's website and record any relevant information found there. Review the data available for your school on the Indiana Department of Education website <http://www.doe.state.in.us/htmls/education.html>. Then write a summary of your findings on the characteristics that may affect your classroom and your students' learning. Add your summary to your Gate D portfolio.

### **Lesson Plans (72 points total) (Due January 28 and February 11)**

You will develop two lesson plans using the Launch-Explore-Summarize teaching model. For each lesson plan, you will submit the lesson plan using the standard lesson plan format. You will use the Connected Mathematics Project curriculum for the first lesson plan and the textbook in use in your student teaching classroom for the second lesson plan.

### **Problem Collection (24 points) (Due February 18)**

You will create a resource for use in future teaching. Consistent with the *NCTM Standards* (2000), you will collect 5 problems each from the following areas: Number, Algebra, Geometry, Measurement, and Data Analysis & Probability. Ideally your problems will be consistent with the grade level in which you are placed for student teaching. Make sure your problems are truly *problems* in that they are not immediately solvable and have more than one way of approaching the solution.

1. Your problem set will consist of 25 problems.
2. Place only one problem per page.
3. Include at least one solution for each problem.
4. At the bottom of each problem page, indicate the reference using APA format.
5. Use dividers to divide the five categories of problems.
6. Number each page and include a Table of Contents.
7. Include a reference page.

**Goals for Student Teaching:** During **Week 6** you should also begin to develop your goals for student teaching. It is expected that you will still have a great deal of room for growth once you've completed student teaching. However, during this experience your university supervisor and cooperating teacher are looking for evidence that demonstrates you have the tools, resources and skills needed to continue your development. This means that it is critical that you work with your university supervisor and cooperating teacher in an initial assessment of your performance (your first observation) at the very beginning of your student teaching experience. Areas of existing strength should be identified, and a plan formulated to address areas in need of improvement. Your progress in the identified areas will be monitored, and by the end of the 10 weeks, your supervisor with input from your cooperating teacher should determine if improvement has occurred. Working with your student teaching supervisor, you should finalize these goals and your plan to achieve them not later than the end of the second week of student teaching. Add them to your Gate D portfolio. To help guide you in the development of your goals, the following section from the Student Teaching Supervisor's Handbook is provided. You should have a *minimum* of one goal in each critical area.

*Purdue University College of Education has identified three critical areas for the professional growth of student teachers. These may be useful in selecting the areas in which the student teacher will focus efforts for improvement:*

*Curriculum in Context*

- *Connections are made within and among learning experiences across mathematics lessons, across mathematics topics, between mathematics and other disciplines, and between mathematics and the real world.*
- *Appropriate varieties of activities, materials and teaching methods are used to pursue different curricular goals and purposes.*
- *Lessons are created to make particular aspects of mathematical knowledge meaningful for students.*
- *The student teacher has a sound grasp of the mathematics relevant to the teaching of middle and high school curriculum.*

#### *Attention to Learners*

- *Learning experiences are planned to address diverse developmental levels and interests of students from a variety of backgrounds.*
- *Classroom students are encouraged to question and interpret ideas, and to share a diversity of perspectives.*
- *A positive learning community is created in which individual differences are respected, and all students have an opportunity to learn.*
- *The teacher monitors and adjusts the planned classroom experiences in response to learner feedback.*

#### *Commitment to Professional Development*

- *The student teacher interacts with colleagues, students and other community members in a professional manner.*
- *The student teacher evaluates the effects of his or her choices and actions on others, and uses the information to modify subsequent choices and actions?*
- *The student teacher varies her or his role in the instructional process (e.g., being the instructor, the facilitator, the audience) in relation to the content and purpose of instruction, and the needs of students.*
- *The student teacher examines the effectiveness of his or her teaching, and continually seeks to adapt the teaching to better help students.*
- *The student teacher is aware of professional organizations, and planning participation in professional activities.*

### Tentative Course Schedule

<b>Date</b>	<b>Topic</b>	<b>Readings(s) Due</b>	<b>Assignment(s) Due</b>
Jan 14	Course Introduction	-----	-----
Jan 21	Worthwhile Mathematical Tasks	NCTM Professional Standards <ul style="list-style-type: none"> <li>• Overview &amp; Assumptions</li> <li>• Tasks (Standard 1)</li> </ul>	Reflection 1 Lesson Plan 1 Draft (Bring 3 paper copies to class for peer review) Microteaching
Jan 28	Mathematical Discourse	NCTM Professional Standards <ul style="list-style-type: none"> <li>• Discourse (Standards 2-4)</li> </ul>	Reflection 2 Lesson Plan 1 Final Microteaching
Feb 4	Learning Environment	NCTM Professional Standards <ul style="list-style-type: none"> <li>• Environment (Standard 5)</li> </ul>	Reflection 3 School Report Microteaching
Feb 11	Analysis of Teaching and Learning	NCTM Professional Standards <ul style="list-style-type: none"> <li>• Analysis (Standard 6)</li> </ul>	Reflection 4 & 5 Lesson Plan 2 Draft (Bring 3 paper copies to class for peer review) Microteaching
Feb 18			Reflection 6 Problem Collection