E343: Teaching Mathematics in the Elementary School
Syllabus
Fall Semester, 2007-2008
Sections 26665 and 26630

Instructors
Dr. Amy Hackenberg (section 26665) Dr. Dionne Cross (section 26630)
Education 3060 Education 3056
Phone: 812-856-8223 Phone: 812-856-8221
ahackenb@indiana.edu dicross@indiana.edu

Class Times and Location
Lecture: Wednesdays 9:30 am – 10:45 am, ED 1120
Recitation: Mondays 9:30 – 10:45 (26665) or 11:15 – 12:30 (26630), ED 3017

Office Hours
We both will hold office hours on Mondays from 1:30 – 3:30 pm, Wednesdays from 2 – 3 pm, or by appointment. Feel free to email, or stop by our offices, or phone at any time; if we are too busy to talk we can arrange for another time.

Required Texts and Materials

Course Packet for E343 available at the IU Bookstore (Union, Eigenmann) and T.I.S. College Bookstore.

Electronic Conference and Mail
We will post assignments, slide shows, study guides, questions about the readings, class notes, and other important information regularly to Oncourse. Please submit all written assignments electronically using Oncourse, and become familiar with Oncourse use by the second week of classes. You are expected to check Oncourse and e-mail regularly.

### Important Dates (note that most due dates are tentative)

<table>
<thead>
<tr>
<th>September</th>
<th>October</th>
<th>November</th>
<th>December</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Labor Day —</td>
<td>15 Midterm Test</td>
<td>14 Learning Trajectory</td>
<td>10 Final Exam</td>
</tr>
<tr>
<td>classes meet</td>
<td>29 Case Study Paper</td>
<td>28 Classroom Conversation</td>
<td>(fyi, our scheduled time is</td>
</tr>
<tr>
<td>17 1st Lesson Plan</td>
<td></td>
<td></td>
<td>10:15 am – 12:15 pm in ED</td>
</tr>
<tr>
<td>24 Counting/Early Number Analysis</td>
<td></td>
<td></td>
<td>1120)</td>
</tr>
</tbody>
</table>
Course Goals

This course has two major foci.

**The first is on how young students learn mathematics.** Throughout the course, you are expected to combine our work in this class and your field experiences to rethink your own knowledge of mathematics, which is critical in coming to understand how others think mathematically. In particular, you should make an effort to look through the eyes of children, trying to understand how they generate mathematical ideas.

**The second is on what can be done to create an environment that helps children construct and understand mathematical concepts.** To teach mathematics means to orchestrate mathematical learning for others, which necessarily involves one’s own mathematical thinking and learning. So in the course you are also expected to develop your own mathematical thinking and learning in order to use your mathematical knowledge effectively in communication with your (future) students.

Specific goals of the course are for you to:

1. **Continue to learn mathematics.** This goal involves continuing to develop as a good mathematical problem solver—a critical component of developing as a good mathematics teacher.

2. **Work actively to develop greater awareness of your own mathematical thinking.** This goal includes rethinking your conceptions about the nature of mathematics; coming to understand aspects of your own mathematical thinking that you take for granted; and developing a habit of searching for foundational ideas in your own mathematical activity.

3. **Learn to listen to and learn from children.** This goal includes coming to see how capable children are of learning mathematics and solving problems; respecting children’s mathematical thinking even when you do not understand it; and allowing what you learn from children to influence your own mathematical thinking and your teaching.

4. **Act upon your listening in order to design and enact appropriate mathematical tasks and activities for children.** This goal includes developing an understanding of how children make changes in their mathematical thinking; engaging in interactions with children that focus on conceptual understanding rather than rote memorization; and learning to envision mathematical communication in your future classroom.

5. **Participate in discussions about a wide range of current issues in mathematics education and research on children’s mathematical learning.** This goal includes co-creating an environment that is safe for students (both elementary school children and your classmates) to share and justify their thinking, ask questions, makes conjectures, and take risks. This goal also involves thinking about ways to design your future classroom to facilitate mathematical learning for all students. Issues to consider include how to engage young students in mathematical discourse, use technology creatively and critically, prepare to teach diverse populations of students, and evaluate the progress of elementary school students.

6. **Become aware of certification requirements and national standards.** This goal includes gaining familiarity with national guidelines such as the 2000 National Council of Teachers of Mathematics Principles and Standards for School Mathematics, as well the Indiana Professional Standards Board (IPSB) Standards for Early Childhood and Middle Childhood Teachers. Prospective teachers in Indiana must meet the state standards as a prerequisite for earning certification.

***Some of the most important “methods” you have as a teacher of mathematics are (a) your own evolving, creative mathematical thinking; and (b) your evolving understanding of your students’ mathematical thinking and how it can change through engaging students in productive mathematical activity.***
Abridged Description of Course Assignments

We will try to make the purpose of each assignment clear. If you have questions about the purpose of the assignment or what is expected of you, please ask—we are always happy to discuss your concerns with you, either in or outside of class.

On all written work, we expect you to demonstrate correct use of the English language with regard to grammar, punctuation, and spelling—we do grade on technical writing skills as well as content. Please proofread your work before submitting it. If you have weaknesses in the area of grammar, punctuation, or spelling, find someone who will proofread your work for you before you turn it in (see also the “Guidelines and Evaluation Practices for Written Assignments” handout).

Each of the course assignments have been allotted a certain number of points out of 500 possible points that you can earn in the course. More information on evaluation of your assignments will follow, and we will give detailed rubrics for each of the major assignments.

All assignments except for portions of #1 below (Homework) are to be submitted electronically using Oncourse. Detailed descriptions for all major assignments will be distributed at a later time and will also be available through Oncourse. Here are brief descriptions:

1. **Homework:** There are three components to homework—mathematical problems, readings, and short writing assignments. You can expect an assignment to be due nearly every time the course meets. 60 points of the total 500 course points are allotted to homework, and typically a single homework assignment is worth 10 points. Homework assignments can only be received on the due date, by 3 pm, and they cannot be made up. *After 3 pm on the due date we will not accept homework assignments for any reason.*

   • **Mathematical Problems:** One of your greatest assets in understanding children’s mathematics is understanding and deepening your own mathematical thinking, as well as your awareness about your mathematical thinking. Therefore, part of this course is about doing mathematics, generating mathematical conversations, and reflecting on your own mathematical knowledge. We will work on many mathematical problems over the course of the semester. You do not need to type these assignments, and you do not need to submit them via Oncourse. Please complete them legibly on paper. In some cases, you may be turning in electronic files depending on the mathematical area we are exploring.

   • **Readings:** For discussion in class, we will ask you to read articles from the course packet, from the required text, and from supplementary texts.

   • **Short Writing Assignments:** We may ask you to do some informal writing in association with preparing a reading, or after class discussion. Writing assignments may also include in-depth exploration about a mathematical concept and/or drafts of mathematical task sequences for children. *All short writing assignments should be typed and usually will be submitted via Oncourse.*

2. **Field Experience and First Lesson Plan:** A small portion of this course, 30 points total, will be based on performance in the mathematics portion of the field experience. The M201 syllabus explains how 20 of those points will be awarded. Additionally, your first lesson plan for the field experience will be graded by your methods instructor and is worth 10 points.

3. **Counting/Early Number Analysis:** Based on our class discussions and readings, write a 4-6 page paper in which you analyze the counting/early number activity of three different students (as provided in class). Your analysis should include what you can infer about the students’ mathematical thinking, what kinds of counting and early number activities you think would be appropriate for the child, and a rationale for why you have selected or designed these activities. This assignment is worth 45 points.

4. **Case Study Paper:** Write an analysis of the mathematical ideas, strengths, and potential areas of development of one of the students you worked with in your mathematics field experience. Focus on what the student seems to know and on how you elicited your understanding of the student’s
knowledge. The paper should be 5-7 pages in length and will be worth 60 points. Evaluation of your paper will be based both on how well you are able to describe the extent of your student’s understanding and on the quality of your writing.

5. **Learning Trajectory:** With 1-2 partners, write a learning trajectory in essay form. As we will discuss in class, formulating a learning trajectory can be the basis for writing many lesson plans, but a learning trajectory is not a plan for a single lesson—instead, it’s a big picture view of your goals, tasks, and activities for students at particular learning levels in a particular mathematical area. In your trajectory, describe how you will assess informally what your students know when you start work on this area; characteristics of the students’ mathematical thinking that you expect to see; problematic situations, tasks, and activities that you will use with students at different learning levels; and what mathematical thinking you are aiming to bring forth in your students. Be sure to design and justify your choice of problematic situations, tasks, and activities based on your goals—the mathematical thinking you are aiming to bring forth in your students. We will discuss this assignment in much more detail during the term. Your trajectory should be 8-10 pages in length and is worth 60 points. Note that you will have class time to start work on your trajectory, and that each member of your group may not receive the same number of points for the assignment.

6. **Classroom Conversation:** With 1-2 partners, develop and write up a classroom conversation to demonstrate the nature of the discourse in which you (as a teacher) and your students might engage around a significant mathematical problem or activity. As we will discuss in class, developing a classroom culture that promotes discourse is integral to your effort to understand your students’ mathematical thinking, and to help them learn. Your conversation, written in dialogue form (like a play), should include statements from at least 4 students and the teacher (you). Prior to the dialogue, set up your conversation by discussing your goals for your students in this situation (learning goals and social/relational goals), and one or two significant goals for yourself as a teacher. Finally, analyze your conversation in terms of progress toward those goals. In particular, in the conversation you should show evidence of where you, as a teacher, made progress toward your goal (for yourself) and where you did not, and you should discuss that in your analysis. Your paper should be 8-10 pages in length and is worth 45 points. As above in #5, we will discuss this assignment in much more detail during the term; you will have class time to start work on this project; and each member of your group may not receive the same number of points for the assignment.

7. **Midterm Exam and Final Exam:** The midterm and the final exam will both be take-home examinations. Each will be worth 100 points.

### Grading Policies

- **Grading Standards:** Grades are based on individual performance in all aspects of the course, with grading rubrics provided for all of the assignments. Every attempt will be made to give grades that are close to those suggested by the *Teacher Education Undergraduate Grading Guidelines*. As noted in the guidelines, (1) an A is representative of outstanding performance and (2) “it is virtually impossible to prespecify all details necessary to achieve a given grade.” The guidelines also state “Students should recognize that effort alone does not necessarily guarantee above average grades.” The grade distribution for mathematics methods courses suggests that most students obtain grades ranging between B and B+. However, with grades based on individual performance rather than a comparison to others, the average grade for the course could end up higher or lower than that.

- **Grading of Homework:** Homework is typically graded according to the following rubrics (the maximum point total for each rubric is 10 points):

<table>
<thead>
<tr>
<th>Mathematical Problems</th>
<th>Weak</th>
<th>Average to Good</th>
<th>Strong</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analysis &amp; Explanation</td>
<td>1</td>
<td>2-3</td>
<td>4-5</td>
</tr>
<tr>
<td>Mathematical Correctness</td>
<td>1</td>
<td>2-3</td>
<td>4-5</td>
</tr>
</tbody>
</table>
Policy on Resubmitting Written Assignments: If you receive less than 75% of the allocated points on an individual or group written assignment, you may if you wish, resubmit the assignment within two weeks of the time the original is returned to you. Please notify your instructors immediately that you plan to resubmit the assignment and attach the original along with your revised version. When grading a resubmitted assignment, we look to see that you have revised the paper based on the comments made on the original. The maximum grade on a resubmitted assignment is 75% of the allocated points. We do not allow retaking of exams.

Policy on Late Assignments: We expect that assignments will be turned in by the announced due dates and times. Assignments are to be submitted online using Oncourse, unless otherwise noted. We will accept assignments other than Homework (see #1) after the due date, but your grade will decrease by 10% of the allocated points for each day the assignment is late. For example, a project worth 50 points that is turned in two days late will receive 10 fewer points than it would have if it had been turned in on time.

Policy on Computer Accidents: Please make sure you save your work frequently and keep backup copies of your files when using a word processor. Computer accidents, while very unfortunate, are not an acceptable excuse to avoid penalties for late work.

Policy on Lost Assignments: You should always keep a copy of every computer file or paper you turn in until your work is graded and you have received your course grade.

Attendance: Attendance is required for all class sessions. Attendance is important for the following reasons. First, as a future teacher it is important to develop the sense of responsibility needed to meet your class every day. Second, activities, ideas, and concepts we work on in class are useful to you as a beginning teacher, and they cannot easily be built up through book readings or someone else’s notes. Third, some class periods will be spent working on group projects. If you are not in attendance on those days you do not contribute to your group’s project and do not benefit from your classmates’ ideas. If you are absent during a session devoted to group work you may be asked to complete the project(s) on your own. Fourth, class includes important whole-class and small-group discussions based on readings and videotapes we watch, as well as laboratory hands-on activities; many of these activities cannot easily be made up individually if you miss class.

Calculation of Final Grades: As noted above, the points for the course total to 500 points as follows:

<table>
<thead>
<tr>
<th>Homework: 60 pts</th>
<th>Learning Trajectory: 60 pts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Experience: 30 pts</td>
<td>Classroom Conversation: 45 pts</td>
</tr>
<tr>
<td>Counting/Early Number Analysis: 45 pts</td>
<td>Midterm: 100 pts</td>
</tr>
<tr>
<td>Case Study Paper: 60 pts</td>
<td>Final Exam: 100 pts</td>
</tr>
</tbody>
</table>

The chart shows the point totals required to achieve specific final course grades, based on a typical 90%-80%-70%-60% scale:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Points</th>
<th>Grade</th>
<th>Points</th>
<th>Grade</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>465 points</td>
<td>B-</td>
<td>400 points</td>
<td>D+</td>
<td>335 points</td>
</tr>
<tr>
<td>A-</td>
<td>450 points</td>
<td>C+</td>
<td>385 points</td>
<td>D</td>
<td>315 points</td>
</tr>
<tr>
<td>B+</td>
<td>435 points</td>
<td>C</td>
<td>365 points</td>
<td>D-</td>
<td>300 points</td>
</tr>
<tr>
<td>B</td>
<td>415 points</td>
<td>C-</td>
<td>350 points</td>
<td>F</td>
<td>&lt;300 points</td>
</tr>
</tbody>
</table>
• **Attendance and Final Course Grades:** Students who are continually participating and have good attendance will have their point totals “rounded up” at the end of the semester if their score is a borderline case. For example, if someone who has earned 430 points has missed class only once, and participated regularly, their score will be rounded up to a B+. Someone with more than two absences who has earned 432 points will not have their score rounded up to a B+ and will receive a B. We usually do not round up scores in the A-range. Students who accrue unexcused absences will have them noted in the attendance roster in Oncourse. An alert form for excessive number of absences will be filed for students who accumulate more than 4 unexcused absences. Students who accumulate 6 or more unexcused absences will receive an FN (failure for nonattendance) grade. A doctor’s note stating the student was too ill to attend class is needed for excused absences; there is a limit of 3 excused absences in the semester. **Please inform your instructor ahead of time if you have an unavoidable, planned absence.**

• **Tardiness:** For all the reasons given about attendance, please don’t be late to class. We have a short time together, and we will need to use all of it to accomplish the goals in the course. Tardiness not only is detrimental to the person who is late (who will miss important information and/or activities); it is disruptive to others. However, we know that occasionally life intervenes. **Please inform your instructor if you know you have an unavoidable conflict and will be late to class.**

• **Cell phones, newspapers, etc.:** Please turn cell phones off during class. If you have an unusual circumstance, please inform your instructor. Also, please do not bring newspapers and other outside reading materials to class—we have plenty to do together to keep us busy!

• **Academic Misconduct:** We hope there will be no need to worry about academic misconduct (cheating, plagiarism, etc.). All university policies concerning academic misconduct will be strictly followed and can be found at [http://dsa.indiana.edu/Code/Part_2pers.html](http://dsa.indiana.edu/Code/Part_2pers.html). Good information about plagiarism can be found at [http://education.indiana.edu/~frick/plagiarism/](http://education.indiana.edu/~frick/plagiarism/). **It is your responsibility to be familiar with these policies.**

**Final Notes**

We want to help you become an excellent elementary mathematics teacher. Please feel free to contact us (email, or stop by our offices) should you wish to discuss matters related to the course or to teaching in general. We are happy to discuss concepts and ideas, course assignments, as well as your grades on assignments. Note that we are willing to react to drafts of papers and assignments **as long as we get those drafts far enough in advance to make comments that you can incorporate into your final draft.** We look forward to working with you this semester!

**Other Text and On-Line Resources**


*Teaching Children Mathematics* and *Mathematics Teaching in the Middle School*, two journals for teachers published by NCTM. These journals are also available on-line (to paid subscribers) at the url for NCTM above.

The official website for the Indiana Department of Education (including information about licensing): [http://www.doe.state.in.us/dps/](http://www.doe.state.in.us/dps/)