**E343: Teaching Mathematics in the Elementary School**  
**Syllabus**  
**Fall Semester, 2012**  
**Sections 16993 and 21755**

### Instructors

| Dr. Amy Hackenberg | A little about me: I taught middle and high school students for 9 years in L.A. and outside of Chicago. Then for 2 years I was a mathematics assistant to teachers in an elementary school in Georgia. I have taught prospective and in-service teachers for 7 years in Georgia; Portland, Oregon; and Indiana. I love teaching students of all ages and look forward to working with you. |
| Education 3060 | ahackenberg@indiana.edu |
| phone: 812-856-8223 |

### Class Times and Location

- **Large Group:** Mondays, 9:30-10:45 am, Wright 1120 (auditorium)
- **Small Group:** Wednesdays, 9:30-10:45 am (16993) or 11:00-12:15 (21755), Wright 3017

### Office Hours

Mondays and Wednesdays from 1 – 2 pm, or by appointment. Feel free to email or stop by my office at any time; if I can’t talk then we can arrange for another time.

### Required Texts and Materials


Additional readings will be posted to Oncourse. ***Please print them and bring them to class.***

### Electronic Conference and Mail

I will post assignments, slide shows, readings, questions about the readings, class notes, and other important information regularly to Oncourse. Please submit all written assignments (not homework) 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

<table>
<thead>
<tr>
<th>August</th>
<th>September</th>
<th>October</th>
<th>November</th>
<th>December</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 Class begins!</td>
<td>3 Labor Day — No Class</td>
<td>3 HW6</td>
<td>7 Classroom Video Analysis due</td>
<td>3 Classroom Conversation Papers due</td>
</tr>
<tr>
<td>22 HW0</td>
<td>5 HW2</td>
<td>10 Midterm Exam due</td>
<td>14 HW8</td>
<td>12 Final Exam due</td>
</tr>
<tr>
<td>29 HW1</td>
<td>12 HW3</td>
<td>24 HW7</td>
<td>28 HW9</td>
<td></td>
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</tbody>
</table>
Course Goals

This course has two major foci.

**The first focus is on how young students learn mathematics.** You are expected to combine our work in this class and your field experiences to look through the eyes of children, trying to understand how they generate mathematical ideas. Doing so requires respecting children as mathematical thinkers! It also involves rethinking your own knowledge of mathematics, which is critical in coming to understand how others think mathematically.

**The second focus is on how to create an environment that helps children develop sound mathematical reasoning and understanding.** To do so necessarily involves developing a framework for understanding how students think and learn mathematics, and learning how to foster productive mathematical interactions with students. Together we will examine and practice ways to interact and communicate mathematically with your (future) students.

Specific goals of the course are for you to:

1. **Continue to do and 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 (“big”) 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 implement appropriate mathematical tasks and activities for children.** This goal includes developing an understanding of how children make changes in their mathematical thinking, as well as engaging in interactions with children that focus on conceptual understanding and adaptive reasoning, rather than rote memorization.

5. **Learn to facilitate mathematical interaction and communication (discourse).** This goal involves learning how to “make space” for children to think and reason mathematically, and learning how to make appropriate and useful interventions to help them to learn more. Above all, this goal requires co-creating an environment that is safe for your future students (and right now, your classmates!) to make conjectures, ask questions, share and justify ways of thinking, listen, and take risks.

6. **Participate in discussions about critical current issues in mathematics education and research on children’s mathematical learning.** These issues include how to teach diverse populations of students by proactively differentiating instruction, how to assess the progress of elementary school students, and how to use technology creatively and critically.

7. **Become aware of certification requirements and national standards.** This goal includes becoming familiar with national guidelines such as the Principles and Standards for School Mathematics (2000) written by the National Council of Teachers of Mathematics (NCTM), as well the Common Core State Standards for Mathematics (CCSSM, 2010). Teachers in Indiana, and in most other states as well, must meet the CCSSM starting in fall 2012.

***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

I will try to make the purpose of each assignment clear. If you have questions about the purpose of an assignment or what is expected of you, please ask—I am always happy to discuss specific concerns with you, although that sometimes has to happen outside of class.

On all written work, I expect you to demonstrate correct use of the English language with regard to grammar, punctuation, and spelling—I do grade on technical writing skills as well as content. Please proofread your work before submitting it. If you have weaknesses in 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 the evaluation of your assignments will follow, and I will give detailed rubrics for each of the major assignments.

All assignments except for most 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 to turn in an assignment about once per week (see calendar on p. 1), and to prepare a reading for every course meeting. Each homework assignment is worth 20 points. I will count your best 7 homework assignments in your course grade, although I will give 9 assignments during the term (not counting HW0). So, 140 points of the total 500 course points are allotted to homework. Homework assignments can only be received on the due date, by 5 pm, and they cannot be made up. After 5 pm on the due date I will NOT accept homework assignments except in the case of *a significant medical issue.*
   - **Mathematical Problems:** One of your greatest assets in understanding children’s mathematics is deepening your own 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 they are not to be submitted via Oncourse. Please complete them legibly on paper.
   - **Readings:** For class discussion, I will ask you to read chapters from the required text, articles posted to Oncourse, and information from on-line resources. The text is a really important resource, and we will get to know it well (it will also be a great resource for you when you start teaching!) Please print posted articles and bring them to class for discussion on the appropriate date. Sometimes I may ask you to engage in on-line discussions via Oncourse about readings or issues, prior to or following class.
   - **Questions on Readings:** Most homework assignments will include questions from the readings to help you digest ideas and prepare for class discussion. I will ask you to think about all questions and to write out responses to some of them. You do not need to type responses, although you can do so if you prefer.

2. **Field Experience:** A portion of this course, 40 points total, will be based on performance in the mathematics portion of the field experience. The M201 syllabus explains how these 40 points will be awarded (based on the total number of points you earn in M201).

3. **Classroom Video Analysis:** Do an analysis of mathematical discourse and the problem-solving environment as depicted in a video recording of an elementary school classroom. Focus on describing and analyzing the moves the teacher makes to promote mathematical talk in the classroom, as well as how the teacher establishes and sustains the problem solving environment in the classroom. Your video analysis should be 5-7 double-spaced pages in length and will be worth 60 points. Evaluation of
your paper will be based on the quality of your observations and analysis of these features of the classroom, as well as the quality of your writing.

4. **Classroom Conversation Paper:** With a partner, write a classroom conversation (a “play”) to demonstrate an elementary school teacher differentiating mathematics instruction for diverse students and learning to promote mathematical discourse. Following the conversation, describe and analyze important features of the conversation that show differentiated instruction and learning to promote discourse. Your conversation should be 6-8 pages in length and will be worth 80 points. Evaluation of your paper will be based on how well you are able to demonstrate skills in each of these critical areas and on the quality of your writing.

5. **Midterm Exam and Final Exam:** The midterm and the final exam will both be primarily take-home examinations, and they are each worth 90 points. Each will include a short in-class part prior to the take-home part.

**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 pre-specify 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:** I evaluate and grade homework according to the following rubric. A detailed description of this rubric will be handed out in class.

<table>
<thead>
<tr>
<th>Homework</th>
<th>Weak</th>
<th>Average</th>
<th>Good</th>
<th>Strong</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thoroughness</td>
<td>1</td>
<td></td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Depth of Reasoning and Explanation: Mathematical Problems</td>
<td>1</td>
<td>2-3</td>
<td>4</td>
<td>5-6</td>
</tr>
<tr>
<td>Depth of Observation and Analysis: Pedagogical Issues</td>
<td>1</td>
<td>2-3</td>
<td>4</td>
<td>5-6</td>
</tr>
<tr>
<td>Mathematical Correctness and Clarity of Communication</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

- **Policy on Resubmitting Assignments:** If you receive less than 75% of the allocated points on an assignment other than homework or the final exam, you may, if you wish, resubmit the assignment within two weeks of the time the original is returned to you. Please notify me immediately that you plan to resubmit the assignment and attach the original along with your revised version. When grading a resubmitted assignment, I look to see that you have revised the assignment based on the comments made on the original. The maximum grade on a resubmitted assignment is 75% of the allocated points.

- **Policy on Late Assignments:** I expect that assignments will be turned in by the announced due dates and times. Assignments are to be submitted on-line using Oncourse, unless otherwise noted. I 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 paper worth 80 points that is turned in two days late will earn 16 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. **I recommend that you make a copy of the take-home portions of your midterm and your final exams before you turn them in.**

• **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. This is one aspect of becoming a professional who is committed to playing a major role in the development of children. 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, 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:

- Homework: 140 pts
- Field Experience: 40 pts
- Classroom Video Analysis: 60 pts
- Classroom Conversation Paper: 80 pts
- Midterm: 90 pts
- Final Exam: 90 pts

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>
</tr>
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<tbody>
<tr>
<td>A (93%)</td>
<td>465 points</td>
</tr>
<tr>
<td>A- (90%)</td>
<td>450 points</td>
</tr>
<tr>
<td>B+ (87%)</td>
<td>435 points</td>
</tr>
<tr>
<td>B (83%)</td>
<td>415 points</td>
</tr>
<tr>
<td>B- (80%)</td>
<td>400 points</td>
</tr>
<tr>
<td>C+ (77%)</td>
<td>385 points</td>
</tr>
<tr>
<td>C (73%)</td>
<td>365 points</td>
</tr>
<tr>
<td>C- (70%)</td>
<td>350 points</td>
</tr>
<tr>
<td>D+ (67%)</td>
<td>335 points</td>
</tr>
<tr>
<td>D (63%)</td>
<td>315 points</td>
</tr>
<tr>
<td>D- (60%)</td>
<td>300 points</td>
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<tr>
<td>F (&lt; 60%)</td>
<td>&lt; 300 points</td>
</tr>
</tbody>
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• **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 (within 5 course points of the next grade). For example, if someone who has earned 430 points has missed class only once and participated regularly and actively, 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. **I usually do not round up scores in the A-range.** Students who accrue unexcused absences will be notified via email. 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.** After 3 excused absences, subsequent absences will be considered unexcused. Please inform me ahead of time if you have an unavoidable absence; please inform me via email if you are experiencing an unexpected event that will cause an absence.

• **If you do miss a class meeting**: (1) Talk in detail with at least one classmate about what we did in class. Preferably talk with two classmates, so you get more than one perspective. (2) Check Oncourse for all new postings, emails, etc. **You are responsible for all information that occurred during your 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, I know that occasionally life intervenes. **Please inform me if you know you have an unavoidable conflict and will be late to class.**
• Religious Holidays: The policy at Indiana University is that instructors must reasonably accommodate students who want to observe their religious holidays at times when academic requirements conflict with those observances. If a conflict with a religious observance exists, a student must make a request to the instructor for a reasonable accommodation for that observance by the end of the second week of the course. Any relevant change to the course calendar affords a new opportunity to make such a request in a timely manner. The request is to be made in writing on a standardized form available at this website: http://www.indiana.edu/~vpfaa/welcome/forms.shtml#Forms (scroll down).

• Cell phones, newspapers, etc.: Please turn cell phones off during class and store them out of sight (not on your desk or in your lap). Please do not send text messages during class—even during our large group meetings. If I have to ask you twice not to text, you will accrue an absence. If you have an unusual circumstance, please inform me. Also, please do not bring newspapers or other outside reading materials to class—we have plenty to do together to keep us busy!

• Checking email: When we work on computers in the latter part of the course, and if you use an e-text throughout the course, please refrain from surfing the web, checking email, sending instant messages, etc. I know it’s very tempting to engage in these activities, especially if you finish a problem or discussion early. However, we have a short time together, and we need all of it for working on the problems at hand and the issues that we are discussing.

• Academic Misconduct: I 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://studentaffairs.iub.edu/ethics/. In particular, it is my obligation to report any academic misconduct at the university level. See http://education.indiana.edu/~frick/plagiarism/ for good information about plagiarism. It is your responsibility to be familiar with these policies.

Final Note
I want to help you become an excellent mathematics teacher of elementary school students. Please feel free to contact me (email, or stop by my office, Wright 3060) if you’d like to discuss matters related to the course or to teaching in general. I am always happy to discuss ideas, course assignments, your grades on assignments, and the process of becoming a professional teacher. I look forward to working with you this semester!

Other Text and On-Line Resources

GOOD RESOURCES FOR LESSON PLANNING:
Teaching Children Mathematics and Mathematics Teaching in the Middle School, two journals for teachers published by NCTM. These journals are available in the Education Library and also on-line (to NCTM members) at the url for NCTM above.
Illuminations, a website of lesson resources published by NCTM: http://illuminations.nctm.org/
TRIAD (Technology-Enhanced, Research-Based Instruction, Assessment, and Professional Development), which includes a link to the Building Blocks curricular materials for preschool children: http://gse.buffalo.edu/org/triad/tbb/index.asp?local=parent
… let’s compile some more …