Fall 9-1-2006

C&I 402.01: Teaching Mathematics K-8

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"Technology is an essential tool for teaching and learning mathematics effectively; it extends the mathematics that can be taught and enhances students’ learning."

*NCTM Position Statement on Technology*

**Overview**

This course is an opportunity to build a conceptual and pedagogical framework for mathematics education, K-8. Throughout the course, the student will get acquainted with elementary and middle school mathematics topics, methods, and materials. In addition to content, other areas to be explored include: curriculum changes, current research in mathematics education, professional organizations, including the National Council of Teachers of Mathematics (NCTM), School Science and Mathematics (SSMA), and other professional organizations.

**Goals of this course**

1. Gain a good view of mathematics
2. Learn about and how to construct problem-based, student-centered approaches to learning.
3. Mathematics is intrinsically rewarding: to learn and to teach!

**Student Objectives**

1. The student will learn the standards set forth by NCTM (2000) for teaching of mathematics K-8. They will become acquainted with topics within these standards and an appropriate methodology for different development levels.
2. The student will be able to develop worthwhile tasks centered on the six Professional Standards for Teaching Mathematics of the NCTM Standards (1991) using a variety of teaching methods and/or materials.
3. The student will become aware of the different learning styles, individual, multicultural and gender differences in children and make applications to their lessons.
4. The student will learn different ways to assess and evaluate students' progress in a mathematics curriculum. We will evaluate ways to assess and look at different rubrics.

5. The student will become acquainted with professional organizations and various research activities that support and influence the teaching of mathematics. (NCTM, SSMA, MCTM, MEA/MFT)

**Required:**


**On reserve in TRC:**

Texas Instruments (1995). *Uncovering Mathematics with Manipulatives and Calculators*. Jacksonville, TX: Author. (There are 2 levels: K-2 and 2-6)


**Assignments**

Attendance/Participation (15%): Attendance and participation is very important on a daily basis. Journal entries will be included as your participation grade. Many pertinent ideas are discussed and covered only in class. Being present and actively participating are aspects of your grade. Communication in class is important. If you need to miss, please email or leave a message, this is a professional courtesy. No more than 2 absences will be permitted. If you are absent more than 2 times, you may drop a letter grade.

Teaching I (15%): Prepare a hands-on, minds-on lesson introducing a concept using a problem based lesson that you will teach in your field placement. The DRAFT will be reviewed by me. Sign up for a conference. Afterwards, set up a time to be observed by your mentor. Reflect as a team or you may choose to reflect individually, using the Professional Standards. See appendix B in text. Final Lesson Plan & Reflection due October 17.

Quiz (10%) There will be two quizzes during the semester covering your readings.
BlackBoard Postings (BB) (10%) Four times throughout the semester you will be working in groups for 4: Two from K-3, two from 4-6 grade level placements and preferably from different schools to gain more perspectives. This group may involve some outside of class time. The results will be posted on-line so the entire class can read and learn from all the postings. See the BB Postings info for details mentioned below.

Assessment of Mathematical Teaching (AMaTe) (20 %): In your field placement or in a Flagship School, work with a student who is struggling with some mathematical concept. See handout for more info. Due Nov 16, 2005.

Integrated Unit (20%): Adhere to Unit Outline given in seminar. Any questions, please ask. Due by Dec 5th

Evaluation Grading Scale

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>95-100</td>
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<tr>
<td>A-</td>
<td>92-94</td>
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<tr>
<td>B+</td>
<td>90-91</td>
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<tr>
<td>B</td>
<td>87-89</td>
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<tr>
<td>B-</td>
<td>84-86</td>
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<tr>
<td>C+</td>
<td>81-83</td>
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<tr>
<td>C</td>
<td>78-80</td>
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<tr>
<td>C-</td>
<td>76-77</td>
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<tr>
<td>D</td>
<td>68-75</td>
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<tr>
<td>F</td>
<td>&lt;68</td>
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All written assignments must be typed/printed on letter quality printer and are due at class time of the assigned day. Late assignments are not accepted.

Graduate Students- Please see me about the graduate increment to receive graduate credit. You will complete an additional project throughout the course of the semester. Typically students complete an action research project in the schools or create additional lessons/ learning centers etc. with assessment of the results. Another choice may be to participate in a graduate seminar throughout the term. This project is worth an additional 40 points; but follow the same grading system as listed below (95-100% A; 92-94% A-, etc.) Please notify me by September 8th to discuss your interest in the graduate increment.

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the Student Conduct Code. The Code is available for review online at http://www.umt.edu/SA/VPSA/index.cfm/page/1321

Informative WEBSITES

http://wps.ablongman.com/ab_vandewalle_math_5 This supports this course & your text.

http://matti.usu.edu/ Manipulative site by standards and grade level

http://www.figurethis.org/ NCTM developed to build the math community with families

http://mathforum.org/dr.math/ Try the self-guided tour. Formulate a question to Ask Dr. Math. Get your students involved!
http://math.rice.edu/~lanius/Lessons/
This is an excellent site of interactive lessons students can do as a center or you can lead them through it projecting it on screen.

http://nctm.org
National Council of Teachers of Mathematics

More lesson ideas http://illuminations.nctm.org

http://www.goENC.com/ A National Clearinghouse for math and science materials

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Readings, Assignments</th>
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</thead>
<tbody>
<tr>
<td>1 Aug 29</td>
<td>Course Overview: Activities &amp; Standards</td>
<td>Journal in class daily Chap 1-3</td>
</tr>
<tr>
<td>Aug 31</td>
<td>Activities &amp; Standards</td>
<td>Bring chap questions</td>
</tr>
<tr>
<td>2 Sept 5</td>
<td>Reform in mathematics, NCTM Standards</td>
<td>Review for quiz</td>
</tr>
<tr>
<td>Sept 7</td>
<td>Planning, Kamaii video, types of teaching</td>
<td>Quiz 1 over ch 1-3</td>
</tr>
<tr>
<td>3 Sept 12</td>
<td>Toliver Tape: Welcome to Mathematics</td>
<td>Chapters 4; BB#1</td>
</tr>
<tr>
<td>Sept 14</td>
<td>Marilyn Burns problem based instruction</td>
<td>Chapters 5</td>
</tr>
<tr>
<td>4 Sept 19</td>
<td>Teaching All Children Mathematics</td>
<td>Chapter 7</td>
</tr>
<tr>
<td>Sept 21</td>
<td>Types of instruction</td>
<td>Quiz 2 over ch 4-7</td>
</tr>
<tr>
<td>5 Sept 26</td>
<td>Assessment: Rubrics <a href="http://www.4teachers.org/">http://www.4teachers.org/</a></td>
<td>Grade Billy’s t, ch 6</td>
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<tr>
<td>Sept 28</td>
<td>Literature &amp; Mathematics <a href="http://sci.tamucc.edu/%7Eeyoung/literature.html">http://sci.tamucc.edu/%7Eeyoung/literature.html</a></td>
<td>Various books! BB #2</td>
</tr>
<tr>
<td>6 Oct 3</td>
<td>No formal class, bring draft of lesson plan</td>
<td>Sign up with me</td>
</tr>
<tr>
<td>Oct 5</td>
<td>No formal class, bring draft of lesson plan</td>
<td>Sign up with me</td>
</tr>
<tr>
<td>7 Oct 10</td>
<td>TEACHING IN THE FIELD</td>
<td>Sign up with mentor</td>
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<tr>
<td>Oct 12</td>
<td>TEACHING IN THE FIELD</td>
<td></td>
</tr>
<tr>
<td>8 Oct 17</td>
<td>Flight: Intro to the SAE Curriculum</td>
<td>Teaching I Due</td>
</tr>
<tr>
<td>Oct 19</td>
<td>Flight: Build planes, SAE Curriculum</td>
<td>BB# 3</td>
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<tr>
<td>9 Oct 24</td>
<td>Analyze Flight data; Maths in Integrated units</td>
<td>SAE materials</td>
</tr>
<tr>
<td>Oct 26</td>
<td>SSMA Meeting Holiday Inn Parkside</td>
<td>Attend meeting</td>
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<tr>
<td>10 Oct 31</td>
<td>Technology: Websites, CBLs &amp; calculators</td>
<td>Chapter 8</td>
</tr>
<tr>
<td>Nov 2</td>
<td>CBLs &amp; calculators</td>
<td>BB# 4</td>
</tr>
<tr>
<td>11 Nov 7</td>
<td>Election Day, Go Vote!</td>
<td></td>
</tr>
<tr>
<td>Nov 9</td>
<td>AMaTE &amp; technology questions</td>
<td>AMaTE Due</td>
</tr>
<tr>
<td>12 Nov 14</td>
<td>TEACHING IN THE FIELD</td>
<td>Sign up with mentor</td>
</tr>
<tr>
<td>Nov 16</td>
<td>TEACHING IN THE FIELD</td>
<td></td>
</tr>
<tr>
<td>13 Nov 21</td>
<td>TEACHING IN THE FIELD</td>
<td>Technology lesson in</td>
</tr>
<tr>
<td>Nov 23</td>
<td>Thanksgiving!</td>
<td>Unit!</td>
</tr>
</tbody>
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Blackboard (BB) Postings

**BB #1: Illuminations Lesson**
- Explore an NCTM lesson using this website: [http://illuminations.nctm.org/](http://illuminations.nctm.org/)
- Each person in the group will find a different lesson. It should be one you could/may teach in your field placement.
- Compare how the concept is explained in an elementary text book.
- Is there a way to teach this concept with a manipulative?
- Remember to note any differences between conceptual and procedural knowledge.
- Relate the activity and text presentations to these two kinds of knowledge.
- Name the NCTM content standard and any process standard that is illustrated.

**BB#2: Literature & Mathematics**
[http://sci.tamucc.edu/%7Eeyoung/literature.html](http://sci.tamucc.edu/%7Eeyoung/literature.html)
- Each person in the group will find a different children’s literature book teaching a mathematics concept. Two people should each find a book for use in the grades K-3. Two other people should each find a book for grades 4-8.
- Name the NCTM content standard and any process standard that is illustrated.
- Describe what lesson in an elementary textbook it relates to.
- Contrast this to how Van De Walle or another methods text presents the concept.
- Include at least one journal question you could ask when using this book in the classroom.

**BB#3 Critique Integrated Curriculum**
- Choose integrated curriculum from two different sources and compare to an elementary math/science textbook. Each group should have different topics to share.
- Two persons will research a K-5 curriculum: K-5: AIMS or GEMS
- Two persons will research 6-8 curriculum: 6-8: SAE and IMaST
- Choose a specific content standard.
- Compare how the concepts are presented. Again, think about conceptual and procedural knowledge.
- What NCTM process standards are covered?
- Compare/contrast this to how Van De Walle or another methods text presents the concept.

**BB#4 Technology Use in the Classroom**
Ti-calculator: TI-10, TI-15, TI-73, Math Explorer
PDA: Personal Digital Assistance or hand-held computer,
SmartBoard (smarttech.com)
Computer websites: http://matti.usu.edu/
http://math.rice.edu/~lanius/Lessons/
- Each group should have one person research how one of these can be used in the 
classroom to teach a math concept.
- Each person can find a concept to share how it can be presented using the 
technology. Compare how it is presented in an elementary textbook.
- Contrast this to how Van De Walle or another methods text presents the concept.

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To access Blackboard: Umonline.umt.edu
Use your SCUID number.
When you log into cyberbear, it is listed.
Your password is the last 6 digits of your student ID number.
Then you can change it.

Need assistance: SCUID # call 243-2606
Password: 243-2974 (closes at 5pm)
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