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C&I 402.02: Elementary Mathematics Curriculum and Methods

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C & I 402
Elementary Mathematics Curriculum and Methods
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"Mathematics is not a spectator sport. To learn mathematics, students must be engaged in exploring, conjecturing and thinking..."
NCTM, *Curriculum and Evaluation Standards for School Mathematics, 1989*

Overview:
The mathematics methods course offers the student the opportunity to build a conceptual and pedagogical framework for mathematics education, K-8. Throughout the course, the student will become 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, assessment practices, and professional organizations including the National Council of Teachers of Mathematics (NCTM).

The NCTM Standards (2000) will provide the basis for coursework. The standards place an emphasis on: problem solving, communicating mathematically, reasoning mathematically, valuing mathematics, using technology appropriately, and gaining confidence in one's ability to do mathematics. The Professional Standards are an addend to the Standards which we will use to guide a reflective practice on your teaching throughout the semester.

Student Objectives:
1. Students will explore the standards set forth by NCTM (2000) for the teaching of mathematics K-8. They will investigate topics within these standards and utilize appropriate methodology for varied levels of development.

2. Students will develop worthwhile tasks centered around the six Professional Standards for Teaching Mathematics of the NCTM Standards (1991) using a variety of teaching methods and/or materials.

3. Students will describe the different learning styles; individual, cultural and gender differences in children and make appropriate adaptations to their lessons.

4. Students will discover varied ways to assess and evaluate student progress in a mathematics curriculum. We will examine different types of rubrics and appropriate ways to use them.

5. Students will become acquainted with professional organizations and research activities that support and influence the teaching of mathematics.

Required Text:
Van De Walle, J. (2001) *Elementary and Middle School Mathematics. Teaching Developmentally.* White Plains, NY: Longman Publishing Company.

Also Required: FAC-PAC at Denny's Copy Stop, corner of Higgins/South.

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

Course Calendar The following is an approximate listing of the topics to be covered in the course and the related reading assignments from the text. You are expected to have read the assignments by the date listed. This list is **tentative**. Chapters are from the text. **FAC-PAC in BOLD**.

Week	Topic	Readings/ Assignments
1 Sept 3	Course Overview	**Constructivist Math,**
Sept 5	NCTM Standards	Chapters 1, 2, 3 ; Journal #1
2 Sept 10	Planning, Video	Chapters 4, 22,
Sept 12	Types of Instruction	**(Mis?)Constructing….;** Journal #2
3 Sept 17	Number and Operations	Chapters 6-11, Journal #3
Sept 19	Number and Operations	Chapters 14, 15, 21
4 Sept. 24	Assessment	Chapter 5, Journal #4
Sept. 26	Algebraic thinking/reasoning	Chapter 19, **Patterning,** Journal #5
5 Oct 1	Literature in Mathematics	Research Paper, **A Better Way to Share**
Oct 3	Geometry	Chapter 17
6 Oct 8	Measurement	Chapter 16
Oct 10	Fractions	Chapter 12, 13
7 Oct 15	TEACHING IN THE FIELD	
Oct 17	MEA Convention	
8 Oct 22	TEACHING IN THE FIELD	
Oct 24	Calculators	Chapter 17, Teaching I - finalized
9 Oct 29	Integrated Unit – Data Analysis -Chocolate	Chapter 18
Oct 31	Integrated Unit - Probability - Chocolate	**Building Math Power**
10 Nov 5	ELECTION DAY – NO CLASS	
Nov 7	Algebra	Chpater 20, **Functions,** Teaching II
11 Nov 12	Integrated Unit – Data Analysis – Chocolate	
Nov 14	Integrated Unit – Probability - Chocolate	Chapter 18
12 Nov 19	TEACHING THEMATIC UNIT	
Nov 21	TEACHING THEMATIC UNIT	
13 Nov 26	TEACHING THEMATIC UNIT	
Nov 28	THANKSGIVING – ENJOY!	
14 Dec 3	Assessment: types/uses	**Lessons from the TIMMS; Portfolio**
Dec 5	Assessment: Creating Assessment Tasks	**Assessment literature**
15 Dec 10	Project Wet – Math connection	**Shazam! You're a Teacher**

Week of Dec 16 Unit Presentations during Exam Week
Section 1: **Wed., Dec. 18: 10:10-12:10** Section 2: **Wed., Dec. 18: 3:20-5:20**

Assignments

Attendance/Participation (45 points) Attendance and participation are very important on a daily basis. Many pertinent ideas are discussed and covered only in class. Being present and actively participating are aspects of your grade. If you do need to miss, please call/leave a message – **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.

Research Paper (50 points) Pick a concept or topic relating to mathematics education under the Math Standard. Read about it in 2 different journal articles (NCTM publications, Teaching K-8), find a web site that is a good resource for this concept. Then find it being taught in 2 different textbooks (reform vs. traditional) from the list in your FAC-PAC p. 3. How do the textbooks handle the topic? You will be sharing your findings with the class.
Due Oct. 1

Teaching I (50 points) Prepare a hands-on minds-on lesson introducing a concept using manipulatives that you will teach in your field placement. The DRAFT will be reviewed before you teach it. Set up a time to be observed by your mentor. Meet and discuss the experience with your mentor. Use the Rubric in your FAC-PAC for the lesson assessment. **ATTACH the RUBRIC.** Reflect as a team using the Professional Standards. **DRAFT due Oct. 4** Final Lesson Plan and Reflection **Due: Oct. 24**

Teaching II (50 points) Prepare a lesson using the TI-Math Explorer or TI-73. Use Uncovering Mathematics with Manipulatives or other resources as your guide. You will teach this in the field. Assessment rubric in FAC-PAC. Turn in your Lesson Plan and Reflection. **ATTACH THE RUBRIC. Due by Nov. 7** (Can be taught anytime).

Mathematics Journal/Portfolio (125 points): Answer questions given in class over activities and/or readings. Turn in on due date as indicated on next page. Interview a student. Do activities with this student. **Due: Dec. 3. ATTACH the RUBRIC.**

Thematic Unit (100 points) Adhere to the Unit Outline given in seminar. Any questions, please ask! **Due Dec. 6**

Evaluation % A = 92-100, B = 84-91, C = 76-83, D = 68-75, F ≤ 67. All written assignments must be typed/printed on letter quality printer and are due at class time of the assigned day. **Late assignments are accepted ONLY with prior approval of the instructor. In cases where Lesson Plans are judged to be less than quality (<76%) students may request consideration for a rewrite of the assignment. This request must be made within 2 days following the return of the assignment. Revisions must be completed within 5 days following the revision agreement.**

Informative WEB SITES
http://www.mathforum.com/
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 a screen.
http://matti.usu.edu
This is another excellent interactive site for students to use as a center. Once in the site go to Virtual Library and select your math concept and grade band. Instructions, ideas for parent involvement, and NCTM Standards are included!!!
http://www.nctm.org --National Council of Teachers of Mathematics – your source for so much information
http://www.enc.org --Eisenhower National Clearinghouse for math and science materials.
http://owl.english.purdue.edu/handouts/research/r apa.html – for APA Style

Mathematics Journal/Portfolio

This Portfolio is due in its entirety by **Dec. 3, 2002**.

I. Foundations and Standards

1. Journal Entry: What does it take to be a good teacher of elementary mathematics? Describe your experiences with mathematics in and out of school. Include a memorable experience (positive or negative) with mathematics. **Due: Sept. 5**

2. Journal entry: Compare/contrast the teaching styles of the teachers in the 3 videos. Describe which style **best** fits your personality and why. **Due Sept. 12**

3. Journal Entry: Using the activities we have explored in class since the first day. Choose one of these activities. Describe which of the NCTM **process standards** the activity addresses. What **content standards** does it address? Describe a problem solving activity you could use in your field placement classroom. **Due: Sept. 17**

4. Journal Entry: Do the activity Horse Sense. Show your work and describe why you feel you have the correct answer. **Due: Sept. 24**

5. Journal Entry: Use the rubric to analyze **ONE** set of problems in your **FAC-PAC**. Include your rationale for why you scored the way you did. **Due: Sept. 26**

II. Reflections

1. Due: Oct. 24 your reflections from your field placement
2. Due: Nov. 7 your reflections from your field placement
3. Due: Upon completion your reflections from your field placement
4. Due: Upon completion your reflections from your field placement

III. The Classroom

6. a. What features of a classroom environment are important – physical set-up and teaching styles – for students to be engaged in doing mathematics? How will this help your students become mathematicians?
b. Describe 5 different ways in which you could create a hands-on classroom for your students should you not have access to manipulative materials when you are in the field. How can you use what is readily available to help children learn math concepts?

IV. Working with a Student

7. Interview a student using some of the questions in your text pages 80-82. Include the questions and responses in your write up. **Include student work/responses.**

8. Do at least 4 problem-solving activities with that student. Why did you choose this type of activity? How did the student respond? Describe the successes and challenges. What did you learn about teaching mathematics? **Include samples of student work.**

V. The Teacher, the Professional

9. A parent questions your approach to teaching mathematics. Justify the use of a problem solving environment in your classroom. Write as though you were speaking directly to the parent.

10. Have your views about teaching mathematics changed any this semester? Look back at your answer to #1. Did anything change? If so, in what way? How will you be an **agent of change**?