

COURSE: Math 4500, Methods of Teaching Secondary School Mathematics
Monday 5:15 ~ 7:45 PM Classroom: NIB 150, 3.0 Cr

INSTRUCTOR: Dr. Clare Banks, banks@dixie.edu
Office: NIB 138 *Phone:* 652-7982
Office Hours: MWF 9:00~11:50, M 4:00~5:00 and by appointment.

PREREQUISITE Math 1210 with an earned grade of C or better or equivalent

TEXTS Posamentier, A. S., Smith, B. S. & Stepelman, J. (2006). *Teaching secondary mathematics: techniques and enrichment units*. (7th ed.). Columbus, Ohio: Merrill Prentice Hall.

National Council of Teachers of Mathematics. (2000). *Principles and Standards for school mathematics*. Reston, VA: NCTM.

TECHNOLOGY The model TI-83 Plus will be used in class and is highly recommended. A computer with a word processor and mathematics equation editor is also recommended.

COURSE	Class presentation (enrichment units)	80 pts
REQUIREMENTS	Class attendance and participation	50 pts
AND	Article Review/Critique	30 pts
PARTICIPATION	Portfolio	20 pts
	Philosophy of Mathematics Education Paper (draft & revised)	40 pts
	Teaching Observation	50 pts
	Teaching Video/Evaluation	100 pts
	Presentation of Mini Lesson	20 pts
	NCTM & Utah SCC Reading	20 pts
	Bulletin Board	20 pts
	Midterm & Final Exams	200 pts

GRADES: Grades will be assigned as follows:

94-100% = A	90-93% = A-	87-89% = B+	83-86% = B
80-82% = B-	75-79% = C+	70-74% = C	65-69% = C-
60-64% = D+	55-59% = D	50-54% = D-	0-49% = F

DISABILITIES: If you are a student with a medical, psychological, or learning disability and need accommodations, contact the Disability Resource Center (652-7516) in the Student Services Center. The Disability Resource Center will determine the appropriate accommodations related to your disability.

OBJECTIVES: All classes in mathematics at Dixie College support the general education goal of the college. Each class will:

- Require students to perform mathematical processes including fractions, percentages, decimals, proportions/ratios, algebraic equations and/or calculus techniques.
- Provide students with application problems that use a variety of methods including arithmetical, algebraic and geometric methods.
- Challenge students to make inferences from mathematical models that include formulas, graphs and tables.
- Provide students with real-life applications that use a variety of mathematical functions.

The goals for Math 4500 are to help preservice and inservice secondary mathematics teachers:

- Enrich mathematics instruction at the secondary level.
- Learn to implement state and national standards.
- Become familiar with current mathematics education research and various mathematics education resources.
- Gain new perspectives about curriculum and methods for teaching secondary school mathematics.
- Gain new knowledge about using technology to enhance mathematics instruction.
- Enhance problem-solving skills
- Improve assessment skills.

RESOURCES

The National Council of Teachers of Mathematics has e-version of the Principles and Standards for School Mathematics.

<http://standards.nctm.org/document/index.htm>

Utah's Secondary Core Curriculum

<http://www.schools.utah.gov/curr/core/corepdf/Mth7-12.pdf>

APA Formatting and Style Guide

<http://owl.english.purdue.edu/owl/resource/560/01/>

PRAXIS: Mathematics Content Knowledge

<http://www.ets.org/Media/Tests/PRAXIS/pdf/0061.pdf>

Though not anticipated, there is always a possibility that changes will be made to this syllabus if during the course of the class it is determined that such changes will better enable the objectives to be reached. You will be notified in class if any such changes occur.

Activities and Assessments

Philosophy of Mathematics Education

At the beginning of the semester, you will write a 2-3 page paper on your philosophy of Secondary Mathematics Education. The paper should be based on but not limited to the following topics:

- What is mathematics?
- What mathematics is appropriate for secondary school students to learn?
- What should be the goals for secondary mathematics education?
- What do you feel is critical in teaching and learning mathematics?
- What do you find challenging in teaching mathematics?
- What forms of assessment should be used to best reflect student learning?
- Where do equity and technology fit into your philosophy?

At the end of the semester, you will review your philosophy of Secondary Mathematics Education and turn in a 1-2 page paper reflecting on how your philosophy may have changed during the semester.

Article Reviews

You will need to write four article reviews. Choose articles from *The Mathematics Teacher* (MT), the *Journal for Research in Mathematics Education* (JRME) or relevant internet sites, dated 2000 or newer for review. Each review should be typed and include in the following order:

- Full bibliographical information for the article (APA style).
- A brief summary of the key points of the article. (The readers of your review should be able to identify the key points that the author wishes to deliver without reading the article itself).
- Your opinions about the strengths and weaknesses of the article. (The readers should be able to identify which voices are from you and which are from the author(s) when reading your critique).
- How the article is related to the NCTM standards.
- How the article will change your teaching or why the article will not be affecting your teaching.
- Make enough copies to share with your classmates, so they can include your review in their portfolio. Include the articles in your portfolio.

Examinations:

Two exams will be held in class covering all the material learned this semester.

NCTM standards and Utah's SCC reading response

Each time you read a section of the NCTM standards/Utah's SCC, summarize it in your own words and include an activity that will enhance the particular standard. When reviewing articles, lesson planning, or when discussing teaching or peer teaching observations, always use the Standards as the basis to discuss the processes and outcomes.

Portfolio

Each student needs to prepare a three-ring binder, in which you include all the materials received from the teacher or classmates, your homework assignments, and materials collected that are related to the class. Use section dividers and name each section.

One section included in your portfolio should be on internet resources. This section should include all websites mentioned in class along with a minimum of 5 other websites of your choosing that might enhance your secondary level teaching. Write a brief description of the websites you choose and submit the URL, making enough copies to share with the class.

Attendance/Participation

Students are expected to attend classes and actively participate in discussions.

Presentation (Enrichment Units)

You need to choose five enrichment units from your textbook to present in class. Use the book as a guideline, treat your classmates as high school students, they must be actively involved in the lessons that you teach, approximately 15 minutes each lesson.

Classroom Observation

You need to choose 1 or 2 high school teachers to do your observations on. A total of 5 observations are needed before you do your video taping of yourself teaching. Fill out observation forms after each classroom observation.

Teaching video/evaluation

Before November 24th, you need to teach a high school mathematics course and video tape the course for you and your classmates to evaluate your teaching demonstration. Details will be provided in class.

Bulletin Board

You need to choose a topic from Secondary Mathematics and display it on a bulletin board. Your classmates along with your instructor will evaluate your display for accuracy, neatness, & creativity.

Dates	Topic	Reading	Homework
Sep 8	The Challenge of Teaching		
Sep 15	Lesson Planning	Posamentier , Chap 2, p. 14 ~ 46 PSSM , p. 11 ~ 27, for each principle, write a paragraph summarizing the main points. UtahSCC , pg.1~10	Present one enrichment topic to the class Decide on a classroom teacher with whom you will do your video taping Find and read an article criticizing the NCTM Standards. (submit summary & critique)
Sep 22	Lesson Planning	Posamentier , Chap 2, p. 46 ~ 62 PSSM , p. 211 ~ 213 UtahSCC , Math 7 Core Curriculum	Present one enrichment topic to the class Prepare a brief presentation on one of the Standards 6-8 Submit your philosophy of Mathematics Education paper
Sep 29	Effective Teaching	Posamentier , Chap 3, p. 63 ~ 83, in p. 74 #2, choose 5 items to present in class, be ready to discuss p. 84 #1 ~ 5. PSSM , p. 287 ~ 289 UtahSCC , Pre-Algebra Core Curriculum	Present one enrichment topic to the class Bulletin Board (1) Prepare a brief presentation on one of the Standards 9~12 Find and read a research article on how mathematics is best learned. (submit summary & critique)
Oct 6	Effective Teaching	Posamentier , Chap 3 p. 84 ~ 108 PSSM , p. 367 ~ 380 UtahSCC , Algebra 1 Core Curriculum)	Present one enrichment topic to the class Find and read an article on motivation. (submit summary & critique)
Oct 13	Problem Solving	Posamentier , Chap 4	Present one enrichment topic to the class Submit 5 midterm questions Report on teaching observation
Oct 20	Midterm Exam		

Oct 27	Technology	Posamentier , Chap 5, p. 164 # 6 (a), (b) UtahSCC , Geometry Core Curriculum	Present one enrichment topic to the class Bulletin Board (2) Present a mini lesson that uses technology in a secondary mathematics classroom.
Nov 3	Assessment	Posamentier , Chap 6, p. 196 #1, #6 PSSM , review assessment standard. UtahSCC , Algebra 2 Core Curriculum	Present one enrichment topic to the class Find a current topic about assessment, submit summary & critique
Nov 10	Enrichment Technique, Classroom Management	Posamentier , Chap 7 UtahSCC , Pre-Calculus Core Curriculum	Present one enrichment topic to the class Find an enrichment activity to present in class.
Nov 17	Research Day		
Nov 24	Extracurricular Activities	Posamentier , Chap 8	Video Tape & critique (1) Bulletin Board (3)
Dec 1	Tips for successful teaching, professional development		Video Tape & critique (2) Submit 5 URLs and descriptions
Dec 8	Learning Theory		Video Tape & critique (3) Submit 5 final questions Submit revised philosophy of Mathematics Education paper
Dec 15	Final Exam		