

Syllabus

0833.600 Problems in Mathematics Education I

CATALOG DESCRIPTION:

0833.600 Problems in Mathematics Education I 3 s.h.

(Prerequisite: Official admission to graduate program and approval of the Program Advisor)

Students investigate recent developments and relevant research in mathematics education. The student identifies a problem, develops a proposal for investigating the problem as a project, and begins to develop a finished report of the project. The project may be either local or national in scope but must deal with a problem in mathematics or computer science education.

OBJECTIVES:

Students in this course will become familiar with current developments in mathematics education through their readings and discussions. Students will synthesize and analyze readings for their peers in the course. Each student will originate and plan a research project in mathematics education, identifying resources needed for the project and developing the tools, techniques, and skills necessary for the project.

CONTENT:

1. Goals & Objectives for Mathematics Education

- 1.1 NCTM Curriculum & Evaluation Standards
- 1.2 State curriculum frameworks/core proficiencies
- 1.3 MAA documents

2. Nature of Mathematics

3. Methods of Research

4. Psychological Foundations of Mathematics Education

5. Teaching Practices and Teachers' Beliefs and Knowledge

6. Mathematics in Grades K-8

- 6.1 Rational numbers, ratio, and proportion
- 6.2 Problem solving
- 6.3 Estimation and number sense

7. High School Mathematics

- 7.1 Algebra
- 7.2 Geometry
- 7.3 Probability & Statistics
- 7.4 Discrete Mathematics
- 7.5 Advanced Mathematics

8. Technology

8.1 Calculators

8.2 Graphing calculators

8.3 Computers

9. Affect

10. Gender, Race, Ethnicity & Language

11. Assessment

11.1 State testing programs

11.2 Alternative assessment techniques

Required texts:

National Council of Teachers of Mathematics. (2000). *PRINCIPLES AND STANDARDS FOR SCHOOL MATHEMATICS*. Reston, VA: National Council of Teachers of Mathematics.

Owens, D.T. (Ed.)(1993). *Research ideas for the classroom: Middle grades mathematics*. New York: Macmillan Publishing Company.

Rosenstein, J.G. Caldwell, J.H., & Crown, W.D.(1996). *New Jersey Mathematics Curriculum Frameworks*.

New Jersey State Department of Education. (1998). *Directory of test specifications and sample items for the Grade Eight Proficiency Assessment (GEPA) and the High School Proficiency Assessment (HSPA) in mathematics*. Trenton, NJ: Author.

Wilson, P.S. (Ed.)(1993). *Research ideas for the classroom: High school mathematics*. New York: Macmillan Publishing Company.

Publication Manual of the American Psychological Association (APA) (buy at any bookstore)

Suggested texts:

Fullan, M.G. (1982). *THE MEANING OF EDUCATIONAL CHANGE*. New York: Teachers College Press.

Grouws, D.H. (Ed). (1992). *HANDBOOK OF RESEARCH ON MATHEMATICS TEACHING AND LEARNING*. New York: Macmillan Publishing Co.

Hiebert, J. (Ed). (1986). *CONCEPTUAL AND PROCEDURAL KNOWLEDGE: THE CASE OF MATHEMATICS*. Hillsdale, NJ: Lawrence Erlbaum Associates.

National Council of Teachers of Mathematics. (1989). *CURRICULUM AND EVALUATION STANDARDS FOR SCHOOL MATHEMATICS*. Reston, VA: National Council of Teachers of Mathematics.

National Council of Teachers of Mathematics. (1991). *PROFESSIONAL STANDARDS FOR TEACHING MATHEMATICS*. Reston, VA: National Council of Teachers of Mathematics.

National Council of Teachers of Mathematics. (1999). *1998-99 HANDBOOK: NCTM GOALS, LEADERS, AND POSITIONS*. Reston, VA: National Council of Teachers of Mathematics.

National Research Council. (1990). *RESHAPING SCHOOL MATHEMATICS: A PHILOSOPHY AND FRAMEWORK FOR CURRICULUM*. Washington, DC: National Academy Press.

Shumway, R.D. (Ed.) (1980). *RESEARCH IN MATHEMATICS EDUCATION*. Reston, VA: National Council of Teachers of Mathematics.

Stenmark, J. (1991). *MATHEMATICS ASSESSMENT: MYTHS, MODELS, GOOD QUESTIONS, AND PRACTICAL SUGGESTIONS*. Reston, VA: National Council of Teachers of Mathematics.