MED 600.970 RESEARCH IN MATHEMATICS EDUCATION SPRING, 2006

Instructor: Bill Blubaugh, Ph.D. **Math office**: 970-351-2820
Office: 2239D Ross Hall **Home phone**: 970-667-8793
Online hrs: Scheduled Online **Email:** Bill.Blubaugh@unco.edu

A. Course Objectives

1. To engage you in basic designs and analyses of educational research;
2. To study the basic research trends and issues in the teaching and learning of mathematics;
3. To identify and discuss problems associated with different research designs including statistical assumptions;
4. To synthesize and re-conceptualize research in mathematics education;
5. To describe areas of research most useful to advancing the teaching and learning of mathematics; and
6. To incorporate areas of research most useful at advancing the teaching and learning of mathematics into classroom practices.

B. Outline of Course Content

1. Research Design and Analysis

a) Basic research designs (qualitative and quantitative)
b) Statistical analysis
c) Reliability and validity concerns

2. Research Trends and Issues in Mathematics Education - An Overview. Readings in Research Ideas for the Classroom.

Such as:
a) Cognitive and affective issues in mathematics education,
b) Cooperative learning in mathematics,
c) Ethnomathematics,
d) Problem solving and metacognition in mathematics,
e) Curriculum developments, and
f) Assessment issues.

3. Research Project - Development and Analysis

You will design and conduct a mini-study focusing on a current issue or curricular trend in your classroom or your school. You will work individually or with a partner in developing the design, conducting the study, and analyzing its results. The research design will be developed, data hypothesized, analyzed and reported online at the end of the semester.

4. Critical Readers of Research in Mathematics Education

You will be directed to read and critique current and pertinent research in mathematics education (research articles to read will be online in blackboard or accessible online on InfoTrac), focusing on the manner in which the studies were designed, carried out, reported, and the statistical analysis that were made. You are expected to become a critical reader in order to properly analyze the qualitative and quantitative research contained in such research journals as: *Journal of Research in Mathematics Education*, *Journal of Educational Psychology*, *Journal of Educational Research*, and *Journal of Mathematical Behavior*. To successfully complete the course, it is important that you become a critical consumer of educational research.

C. Required Texts

Introduction to Research in Education (with InfoTrac), (seventh edition)
Ary, Jacobs, Razavieh, and Sorensen (2006), ISBN : 0-534-55537-3
www.wadsworth.com

D. Course Requirements

A letter grade will be assigned based on the following requirements:

1. Write-ups of critical analyses of two assigned research readings.
2. Assignments in Blackboard, and InfoTrac College Edition online work.
3. The design, analysis and write-up of a research mini-project using hypothetical data.
4. Two online tests based on assigned readings and homework assignments from your required research textbook.

To successfully complete the course you are expected to attain a master's level of scholarship in critiquing existing research publication in mathematics education, as well as in designing and analyzing a researchmini-study of your own. You will also become familiar with some of the current research in mathematics education.

E. Course Evaluation

Each of the four Course Requirements (above) will have about equal weight. Therefore, each requirement will count 20% to 30% of your course grade. A letter grade will be assigned based on the following percent of total points obtained.

A: 100 – 90% B: 89 – 80% C: 79 – 70% D: 69-60% F: below 60%

F. Bibliography of Pertinent Work

Bordons, K. & Abbott B. (2002). *Research Design and Methods: A Process Approach (5th edition)*, McGraw-Hill Higher education, Boston, MA.

Cozby, P. (2001). *Methods in Behavior Research (7th edition),* Mayfield Publishing company, Monutain View, CA.

Eisenhart, M. & Borko, H. (1993). *Designing Classroom Research: Themes. Issues, and Struggles,* Allyn and Bacon: Needham Heights, MA.

English, L. (ed.) (2002). *Handbook of International Research in Mathematics Education*, Lawrence Erlbaum Associates: Mahwah, NJ.

Glanz J. (2003). *Action Research: An Eductional Leader's Guide to School Improvement (2nd edition),* Christopher-Gordon Publishers, Inc., Norwood, MA.

Grouws (ed.), (1992). *Handbook on Research on Mathematics Teaching and Learning*, NCTM, Inc.: Reston, VA.

Kelly, A. & Lesh, E. (2000). *Research Design in Mathemtics and Science Education,* Lawrence Erlbaum Associates: Mahwah, NJ.

Lancy, D. F., (1993). Qualitative Research in Education: An Introduction to the Major Traditions. Longman Publishing Company: White Plains, NY.

Leedy, P. D. & Ormrod, J. E. (2005). *Practical Research: Planning and Design (8th edition* , Pearson Education, Inc: Upper Saddle River, NJ.

Mills, G. E. (2003). *Action Research: A Guide for the Teacher Research (2nd edition)*, Pearson Education, Inc: Upper Saddle River, NJ.

National Council of Teachers of Mathematics, (2000). *Principle and Standards for School Mathematics*, NCTM, Inc.: Reston, VA.

Oja, S. N. & Smulyan, L. (1989). Collaborative Action Research: A Developmental Approach, The Falmer Press: Philadelphia, PA.

Robinson, V. (1993). *Problem-Based Methodology: Research for the Improvement of Practice*. Pergamon: Oxford, England.

Sagor, R. (1992). *How to Conduct Collaborative Action Research*, Association for Supervision and Curriculum Development: Alexandria, VA.

Weekly Schedule and Required Readings for Spring 2006

Ary: *Introduction to Research in Education (6th edition)*

Week of	Class Focus	Readings from Text	
ASAP	The Nature of Scientific Inquiry	Ary:	Chapter 1
ASAP	The Scientific Approach in Education	Ary:	Chapter 2
ASAP	The Research Problem	Ary:	Chapter 3
1/30	Action Research	Ary:	Chapter 17
2/6	The Hypothesis	Ary:	Chapter 5
2/13	Descriptive Statistics	Ary:	Chapter 6 (pp136-154)
2/20	Sampling and Inferential Statistics **Research Critique # 1**	Ary;	Chapter 7
2/27	Tools of Research	Ary:	Chapter 8 (pp 216-224)
3/6	Validity and Reliability	Ary:	Chapter 9
3/13	**Test #1 (Chapters 1, 2, 3, 5, 6, 7, 8, 9, 17)**		
3/27	Experimental Research	Ary:	Chapter 10
4/3	Correlational Research	Ary:	Chapter 13
4/10	Survey Research **Research Critique # 2**	Ary:	Chapter 14
4/17	Qualitative Research: Defining, Selecting, and Planning	Ary:	Chapter 15
4/24	**Test 2 (Chapters 8, 9, 10, 13, 14, 15)** Teachers Issues or Classroom Instruction		
5/1	Project Presentations in Blackboard Teachers as Researcher		