

GEORGE MASON UNIVERSITY
Graduate School of Education

Course Title: Mathematics Education Curriculum Design and Evaluation (K-8)
Program Code: EDCI 856 001 (3 credits)
Fall 2011

Instructor:	Dr. Margret Hjalmarson	Office Hours:	By appointment
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Office:	207A Commerce II Bldg.	Class Meets:	Wednesday, 7:20-10:00 pm

I. Course Description

Yearlong seminar for Ph.D. students in the Mathematics Education Leadership cohort program. Students engage in research, analysis, design and evaluation of school mathematics curricula. Prerequisite: Admission to the Mathematics Education Leadership Ph.D. Program

II. Student Outcomes

At the conclusion of this course, students should be able to:

- A. Identify standards-based school mathematics curriculum projects; Analyze key characteristics of outstanding curriculum materials for school mathematics.
- B. Examine learning theories that have been influential in mathematics education and identify ways those theories have been translated into curriculum materials and strategies for teaching.
- C. Evaluate research on NSF-funded and commercially developed school mathematics curriculum materials to make informed choices.
- D. Present and discuss a set of school mathematics curriculum materials in depth.
- E. Design a school mathematics curriculum project.

III. Relationship to Program Goals and Professional Organization

EDCI 856 is designed to enable mathematics education leaders to evaluate and develop mathematics curriculum materials appropriate for school mathematics. The course was developed according to the joint position statement of the Association of Mathematics Teacher Educators (AMTE) and the National Council of Teachers of Mathematics (NCTM) on Principles to Guide the Design and Implementation of Doctoral Programs in Mathematics Education.

This position statement indicates that the core knowledge expectations for doctoral study in mathematics education include:

- Design effective curricula and learning environments to facilitate the development of deep and connected mathematical understanding,
- Curriculum design, analysis and evaluation,
- Studies of different strands of curricula,
- Comparisons of international curricula,
- Knowledge of historical, social, political, and economic factors impacting mathematics education, and

- Studies of mathematical concepts across grade levels.

IV. Nature of Course Delivery

The delivery of this course combines methods of lecture, discussion, independent study/research, student presentation, and writing.

IV. Texts and Readings

NSF-Sponsored Curriculum (online resource). The K-12 Mathematics Curriculum Center (www.edc.org/mcc/curricula.htm)

Selected articles will be posted on Blackboard (see list at the end of the syllabus).

V. Course Requirements and Assignments

A. Curriculum Research Paper (25%)

Select a topic in curriculum research (e.g., teachers' use of curriculum, curriculum fidelity, curriculum design, student achievement) and review the literature related to that aspect of curriculum design, use, implementation or development.

B. Equity and Curriculum (25%)

Select an area of diversity in mathematics education (e.g., linguistic, gender, cultural, socioeconomic) and write a paper reviewing the literature in the topic area. Describe what is known in the topic area based on research.

C. Read and Summarize a Dissertation (20%)

Select a dissertation to read from the list provided. Prepare a presentation for the class about the dissertation including the following sections: background information, research questions, methodology, results, and implications for further research.

D. Article Leading (20%)

Select one of the articles assigned for reading during the week. Prepare a summary using the abstract format provided. Lead a discussion of the article in class.

E. Update Vita and Cover Letter (10%)

Update your vita and write a cover letter to accompany your CV. The goal of this assignment is to have you critically exam your goals and objectives in the Ph.D. program and articulate those goals to a prospective employer. It is also designed to help you reflect on areas where you might want to do more work or gain more experience.

Attendance. It is your responsibility to attend all class sessions and to be on time for each class session. You are held accountable for all information from each class session whether you are present or not. Please report your reasons for any absences to the instructor in writing/email.

VI. Evaluation Schema

Determination of the Final Grade:

Graduate Grading Scale

A	93%-100%	B+	87%-89%	C	70%-79%
A-	90%-92%	B	80%-86%	F	Below 70%

VII. College and University Policies

The university has a policy that requests students to turn off pagers and cell phones before class begins.

All assignments and papers must be written using **APA 6th edition** formatting.

GSE Syllabus Statements of Expectations

The Graduate School of Education (GSE) expects that all students abide by the following:

Students are expected to exhibit professional behavior and dispositions. See gse.gmu.edu for a listing of these dispositions.

Students must follow the guidelines of the University Honor Code. See http://www.gmu.edu/catalog/apolicies/#TOC_H12 for the full honor code.

Students must agree to abide by the university policy for Responsible Use of Computing. See <http://mail.gmu.edu> and click on Responsible Use of Computing at the bottom of the screen.

Students with disabilities who seek accommodations in a course must be registered with the GMU Office of Disability Services (ODS) and inform the instructor, in writing, at the beginning of the semester. See <http://www2.gmu.edu/dpt/unilife/ods/> or call 703-993-2474 to access the ODS.

Approved March 2004, Revised January 2010

VII. Course Schedule

Class meets 10:00 – 3:00 PM, Second Saturdays of the month (note exceptions)

Date	Topic and Reading	Assignment due
8/31/11	Introduction to Curriculum (Clements, 2007)	
9/7/11	Ideal Curriculum: National Policy <i>Common Core Standards</i> (Cobb & Jackson, 2011; Porter, McMaken, Hwang, & Yang, 2011a, 2011b)	
9/14/11	Curriculum History & Theory (Dewey, 1902)- <i>Child & the Curriculum</i> (Baker et al., 2010)	<i>Updated CV & Cover Letter</i>
9/21/11	Curriculum Comparison (Schmidt, Houang, & Cogan, 2002; Schmidt, Wang, & McKnight, 2005)	
9/28/11	Curriculum & Students (Gutstein, 2003; Schoenfeld, 2002; Stein, Remillard, & Smith, 2007) (Note Stein, Remillard & Smith is in the Handbook)	
10/5/11	Large Scale Studies (Harwell et al., 2007; Post et al., 2008)	
10/12/11	Implemented: Teachers & Curriculum (Remillard, 1999) (Remillard, 2000)	<i>Equity and Curriculum Paper</i>
10/19/11	Curriculum Design & Selection (Hjalmarson & Lesh, 2008; Stein & Kaufman, 2010)	
10/26/11	MTW, Chapter 1, 2, 3	<i>Dissertation Presentations</i>
11/2/11	MTW, Chapter 4, 5 MTW, Choose either 6 or 7	<i>Dissertation Presentations</i>
11/9/11	MTW, Chapters 9, 10 MTW, Choose either 8 or 11	
11/15/11	MTW, Choose 15 or 16 MTW, Chapters 18, 19	
11/23/11	Thanksgiving – No Class	
11/30/11	MTW, Choose 2 of 20, 21, or 22 MTW, 23, 24	
12/7/11		Curriculum Research Paper

Readings

- Baker, D., Knipe, H., Collins, J., Leon, J., Cummings, E., Blair, C., & Gamson, D. (2010). One Hundred Years of Elementary School Mathematics in the United States: A Content Analysis and Cognitive Assessment of Textbooks from 1900 to 2000. *Journal for Research in Mathematics Education*, 41(4), 383-423.
- Clements, D. H. (2007). Curriculum research: Toward a framework for “Research-based Curricula.” *Journal for Research in Mathematics Education*, 38(1), 35-70.
- Cobb, P., & Jackson, K. (2011). Assessing the Quality of the Common Core State Standards for Mathematics. *Educational Researcher*, 40(4), 183 -185. doi:10.3102/0013189X11409928
- Dewey, J. (1902). *The child and the curriculum*. Chicago: University of Chicago Press.
- Gutstein, E. (2003). Teaching and learning mathematics for social justice in an urban, latino school. *Journal for Research in Mathematics Education*, 34(1), 37-73.
- Harwell, M. R., Post, T. R., Maeda, Y., Davis, J. D., Cutler, A. L., Andersen, E., & Kahan, J. A. (2007). “Standards”-based Mathematics Curricula and Secondary Students’ Performance on Standardized Achievement Tests. *Journal for Research in Mathematics Education*, 38(1), 71-101.
- Hjalmarson, M., & Lesh, R. (2008). Engineering and design research: Intersections for education research and design. In L. English (Ed.), *Handbook of international research in mathematics education* (2nd ed., pp. 520-534). New York: Routledge.
- Porter, A., McMaken, J., Hwang, J., & Yang, R. (2011a). Common Core Standards. *Educational Researcher*, 40(3), 103 -116. doi:10.3102/0013189X11405038
- Porter, A., McMaken, J., Hwang, J., & Yang, R. (2011b). Assessing the Common Core Standards. *Educational Researcher*, 40(4), 186 -188. doi:10.3102/0013189X11410232
- Post, T. R., Harwell, M. R., Davis, J. D., Maeda, Y., Cutler, A., Andersen, E., Kahan, J. A., et al. (2008). “Standards”-Based Mathematics Curricula and Middle-Grades Students’

- Performance on Standardized Achievement Tests. *Journal for Research in Mathematics Education*, 39(2), 184-212.
- Remillard, J. T. (1999). Curriculum Materials in Mathematics Education Reform: A Framework for Examining Teachers' Curriculum Development. *Curriculum Inquiry*, 29(3), 315-342.
- Remillard, J. T. (2000). Can Curriculum Materials Support Teachers' Learning? Two Fourth-Grade Teachers' Use of a New Mathematics Text. *Elementary School Journal*, 100(4), 331-50.
- Schmidt, W., Houang, R., & Cogan, L. (2002). A Coherent Curriculum: The Case of Mathematics. *American Educator*, 26(2), 10-26,47.
- Schmidt, W., Wang, H. C., & McKnight, C. C. (2005). Curriculum Coherence: An Examination of US Mathematics and Science Content Standards from an International Perspective. *Journal of Curriculum Studies*, 37(5), 525-559.
- Schoenfeld, A. (2002). Making mathematics work for all children: Issues of standards, testing, and equity. *Educational Researcher*, 31(1), 13-25.
- Stein, M. K., & Kaufman, J. H. (2010). Selecting and Supporting the Use of Mathematics Curricula at Scale. *American Educational Research Journal*, 47(3), 663-693.
- Stein, M. K., Remillard, J. T., & Smith, M. (2007). How curriculum influences student learning. In F. K. Lester (Ed.), *Second handbook of research on mathematics teaching and learning* (pp. 319-370). Charlotte, NC: Information Age Publishing.

Additional Articles

- Baker, D., Knipe, H., Collins, J., Leon, J., Cummings, E., Blair, C., & Gamson, D. (2010). One hundred years of elementary school mathematics in the United States: A content analysis and cognitive assessment of textbooks from 1900 to 2000. *Journal for Research in Mathematics Education*, 41(4), 383-423.
- Clements, D. H. (2007). Curriculum research: Toward a framework for "Research-based Curricula". *Journal for Research in Mathematics Education*, 38(1), 35-70.
- Dewey, J. (1902). *The Child and the Curriculum*. The University of Chicago Press: Chicago.
- Hirsch, C. (2007). *Perspectives on the design and development of school mathematics curricula*. National Council of Teachers of Mathematics: Reston, VA.
- National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics*. Reston, VA: Author.

- Post, T. R., Medhanie, A., Harwell, M., Norman K. W, Dupuis, D. N., Muchlinksi, T., ... Monson, D. (2010). The impact of prior mathematics achievement on the relationship between high school mathematics curricula and postsecondary mathematics performance, course-taking, and persistence. *Journal for Research in Mathematics Education*, 41(3), 274-308.
- Remillard, J. (1999). Curriculum materials in mathematics education reform: A framework for examining teachers' curriculum development. *Curriculum Inquiry*, 29(3), 315-342.
- Schoenfeld, A. H. (2002). Making mathematics work for all children: Issues of standards, testing, and equity. *Educational Researcher*, 31(1), 13-25.
- Schmidt, W. H., Wang, H. C., McKnight, C. C. (2005). Curriculum coherence: An examination of US mathematics and science content standards from an international perspective. *Journal of Curriculum Studies*, 37(5), 525-559.
- Stein, M. K., Remillard, J., Smith, M. S. (2007). How curriculum influences student learning. In F. K. Lester (ed.), *Second handbook of research on mathematics teaching and learning* (pp. 319-370). Information Age Publishing: Charlotte, NC.