**GEORGE MASON UNIVERSITY**
Graduate Course Inventory Form
(Prepare and forward with your course proposal to the Graduate Council)

<table>
<thead>
<tr>
<th>N=New</th>
<th>M=Modify</th>
<th>D=Delete (circle one or bold)</th>
</tr>
</thead>
</table>

Local Unit: **Graduate School of Education**

<table>
<thead>
<tr>
<th>Course Abbrev.: EDCI</th>
<th>Grad Council Approval Date:</th>
</tr>
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</table>

**Full Course Title:** Mathematics Education Research on Teaching and Learning (K-8)

<table>
<thead>
<tr>
<th>Abbrev. Course Title (max. 24 Characters): Mth Educ Res Tch Lrn</th>
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<table>
<thead>
<tr>
<th>Credit Hours: 3</th>
<th>Program of Record: Mathematics Education Leadership</th>
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Submitted by: Patricia S. Moyer-Packenham

<table>
<thead>
<tr>
<th>Repeatable for Credit? N</th>
<th>Y=Yes, not within same term</th>
<th>Up to ______ hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>T=Yes, within the same term</td>
<td>Up to ______ hours</td>
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<tr>
<td>N=Cannot be repeated for credit</td>
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Activity Code: __X___ LEC - Lecture, _____ LAB.- Lab, ______ RCT - Recitation, ______ STU - Studio,______ IND - Independent Study, ______ INT - Internship

Catalog Credit Format: _3_: _3_: _0_ Course Level: GF (500-600) ___ GA (700+) _X___

Grade Type: ___GT___ GR: graduate grading, normal (A, A-, B+, B, C, F, IN, AB)


Maximum Enrollment: _____10_____

Submit for **New** courses - First term to be offered: ____Fall 2004_____

Prerequisites: Admission to the Mathematics Education Leadership Ph.D. Program

Corequisites:

Catalog Description for the course proposal (35 words or less):

Yearlong seminar for Ph.D. students in the Mathematics Education Leadership cohort program. Students survey the most current research literature in mathematics education and engage in research, study, and discussion of mathematics education research on teaching and learning in school settings.

Submit for **Modified or Deleted** courses as appropriate: effective:

Last Term Offered ______  Previous Course Abbreviation ______  Previous Number ______

Description of modification:

Approval Signatures:

Dept/Prog: ____________________________ Date: ____________

College Committee: ______________________ Date: ____________

Graduate Council Representative: ______________________ Date: ____________
GEORGE MASON UNIVERSITY
Graduate Council Course Coordination and Approval Form

Catalog description of course:
Departmental code or prefix, number, title of course and credit hours; prerequisites; and description of course as it will appear in the catalog. Note that course descriptions are limited to approximately 35 words in the Graduate Catalog.

EDCI 855 Mathematics Education Research on Teaching and Learning, K-8 (3:3:0). Prerequisite: Admission to the Mathematics Education Leadership Ph.D. program. Yearlong seminar for Ph.D. students in the Mathematics Education Leadership cohort program. Students survey the most current research literature in mathematics education and engage in research, study, and discussion of mathematics education research on teaching and learning in school settings.

For course modifications, describe the changes made to the course and justification for those changes:

Approval from other units:
Please list those units outside of your own who may be affected by these changes in the course. Each of these units must approve this change prior to its being submitted to the Graduate council for approval.

<table>
<thead>
<tr>
<th>Unit</th>
<th>Unit head</th>
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Graduate Council approval: ________________________________

Graduate Council representative: __________________________ Date: ________

Attach copy of school/college/institute course proposal form or modification memo showing approval date and background data on course.

GEORGE MASON UNIVERSITY
Graduate School of Education

Course Title: Mathematics Education Research on Teaching and Learning (K-8)
Program Code: EDCI 855 001 (3 credits)
I. Course Description

Yearlong seminar for Ph.D. students in the Mathematics Education Leadership cohort program. Students survey the most current research literature in mathematics education and engage in research, study and discussion of mathematics education research on teaching and learning in school settings.

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. Read, interpret, critique and synthesize quantitative and qualitative research in mathematics education.
B. Develop an in-depth knowledge base of research in mathematics education.
C. Develop and articulate a theoretical framework for teaching and learning in mathematics education.
D. Articulate and present a critical analysis of the research in several specific areas of mathematics education.

III. Relationship to Program Goals and Professional Organization

EDCI 855 is designed to enable mathematics education leaders to read, interpret, and evaluate critical issues in mathematics education research that impact mathematics teaching and learning. 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:

- Knowledge of historical, social, political, and economic factors impacting mathematics education,
- Critique research reports,
- Synthesize research results,
- Interpret research findings for practitioners,
- Communicate research results clearly to a variety of audiences,
- Apply general methods of inquiry, and
- Demonstrate knowledge of current and historical research in mathematics teaching and learning.

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

Selected articles:


Additional resources:


Subscription to Teaching Children Mathematics (for the elementary grades) or Mathematics Teaching in the Middle School (for the middle grades) journals available from the National Council of Teachers of Mathematics, 1906 Association Drive, Reston, VA 22091; 703-620-9840; nctm.org website.

V. Course Requirements and Assignments

The assignments across the semester are intended to develop skills in the interpretation, critique and synthesis of mathematics educational research. Students interpret research findings and communicate research results appropriate for a variety of audiences. They develop and articulate a theoretical framework for teaching and learning mathematics. All assignments are to be completed on time so that class members might benefit from the expertise and contributions of their colleagues.

A. Research Abstracts (20% of course)

Mathematics education research has contributed greatly to the teaching and learning of mathematics in K-12 school settings. There are many journal articles describing research on the use of representations in mathematics. This assignment supports the development of your knowledge base in this area.

Select FIVE research articles that focus on the use of representations in teaching mathematics. At least two of the studies must use qualitative methods and at least two of the studies must use quantitative methods. Use APA format to cite the articles and write a summary (abstract length) of each article that includes: (1) age/grade level of the participants in the study, (2) number of participants, (3) representations used, (4) math concept taught, (5) duration of the study, (6) research methods/procedures, and (7) results. Present a summary of the five studies to your peers during a class session. Provide a copy of your research abstracts for each member of the class.

B. Historical Research Review (20% of course)

Schools operate in a social context that is influenced by a variety of historical, social, political, and economic factors. Mathematics education is not immune to the forces shaping education in general, and it is important that mathematics educators understand these forces and how they work. Knowledge of this history provides a valuable lens to interpret, understand, and act upon these areas and to participate in the process of improvement. This assignment supports the development of your knowledge base in this area.

Select FIVE research articles that focus on reports from major commissions, committees, and professional organizations that discuss policies that have influenced and shaped the evolution of mathematics education. Use APA format to cite the articles and write a summary (abstract length) of each article that includes the educational significance of the study, report, or research perspective and the impact of the research on teachers, teacher educators, students, administrators, parents, the mathematics education community, and future research endeavors. Provide a copy of your summary for each member of the class. Use Powerpoint and other forms of technology to prepare and present your findings during a class session.
C. Theoretical Framework (20% of course)

Develop and articulate a theoretical framework for teaching and learning in mathematics education. Use a variety of primary sources to support the development of your framework (minimum of 15 references). Describe how this framework shapes your thinking about research in mathematics education.

D. Critical Issues Reflection Papers (30% of course)

Write two papers on two different critical issues of current importance in mathematics education. The following questions should be addressed in the papers: How does the issue impact the teaching and learning of mathematics? How does the issue impact parents, teachers, and students? How does the issue impact assessing students’ understanding of mathematics? How will the issue impact mathematics classrooms of the future? What role does the issue play in your personal theory about the mathematics teaching and learning process? Cite at least five references from the mathematics education literature pertaining to the critical issue. Discuss how mathematics education scholars have addressed this issue and whether you agree or disagree with these scholars. Papers should be 4-5 pages in length.

E. Discussion Record (10% of course grade)

During each class session, students participate in discussions of readings and student presentations and provide written feedback to class members. A discussion record is maintained during each of these class sessions documenting the participation of each class member. Students are graded on their contributions to these discussions and on their written evaluation feedback for class members.

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. Possible Evaluation Schema

Determination of the Final Grade:

Graduate Grading Scale

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage Range</th>
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<tbody>
<tr>
<td>A</td>
<td>93%-100%</td>
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<tr>
<td>A-</td>
<td>90%-92%</td>
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<tr>
<td>B+</td>
<td>87%-89%</td>
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<tr>
<td>B</td>
<td>80%-86%</td>
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<tr>
<td>C</td>
<td>70%-79%</td>
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<tr>
<td>F</td>
<td>Below 70%</td>
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</table>

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

VII. Course Schedule

Class meets 10:00 – 2:30 PM, Saturdays

<table>
<thead>
<tr>
<th>Week</th>
<th>Class</th>
<th>Topic and Reading</th>
<th>Reading</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td></td>
<td>A History of Research in Mathematics Education Handbook – Ch #1-2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Reading, Interpreting and Critiquing Mathematics Educational Studies Handbook – Ch #3-4</td>
<td></td>
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<tr>
<td>3</td>
<td></td>
<td>Critical Issues - Historical, Social, Political, and Economic Factors Impacting Mathematics Education Research Handbook – Ch #21-26</td>
<td></td>
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<tr>
<td>4</td>
<td></td>
<td>Quantitative and Qualitative Research in Mathematics Education Selected studies</td>
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<tr>
<td>5</td>
<td></td>
<td>A Theoretical Framework for Teaching and Learning in Mathematics Education Handbook – Ch #5-11</td>
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<tr>
<td>6</td>
<td></td>
<td>International Mathematics Education Research</td>
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<thead>
<tr>
<th></th>
<th>Title</th>
<th>Handbook – selected chapters</th>
<th>Selected studies</th>
</tr>
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<tbody>
<tr>
<td>7</td>
<td>Critiquing and Synthesizing Research Results</td>
<td>Handbook – selected chapters</td>
<td>Selected studies</td>
</tr>
<tr>
<td>8</td>
<td>Critiquing and Synthesizing Research Results</td>
<td>Handbook – selected chapters</td>
<td>Selected studies</td>
</tr>
<tr>
<td>9</td>
<td>Interpreting Research Findings for Practitioners</td>
<td>Handbook – selected chapters</td>
<td>Selected studies</td>
</tr>
<tr>
<td>10</td>
<td>Interpreting Research Findings for Practitioners</td>
<td>Handbook – selected chapters</td>
<td>Selected studies</td>
</tr>
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</table>

Handbook – Ch #27 & #28
TIMSS – Hiebert & Wang readings