Mathematics Department

Millersville University

Master of Education in Mathematics (M.Ed.)

MASTER OF EDUCATION DEGREE IN MATHEMATICS

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1. INTRODUCTION

a. Millersville University

Rated one of the finest regional universities in the country by US News and WillertdvReport University has a tradition of graduate education that dates back remaining hestabetished in 1855 as the Commonwealth's first normal school, Millersville University is one of the fourteen institutions i PennsylvanState System of Higher Education.

A multipurpose university situated on **ac26**@ ampus, Millersville blends the spirit of innovation with the strength of tradition in academic and professional programs that serve a diverse region population. The campus reflects a combination of the old and the new, with beautiful Victorian building stateof theart research labs and technology centers.

The graduate enrollment includes students from numerous states and several foreign countries. If graduate students are engaged in or intend to pursue careers in teaching, while others have achi success in vaing professions. Millersville University graduates have gone on to distinction at programs in the nation's finest universities are student Association represents the academic and social interests of the graduate student population.

b. The Department

The diverse backgrounds of the faculty in the Department of Mathematics at Millersville University a candidates for the M.Ed. aitheometry and perspective or to focus on a specific area. Currently presented monghe twenty one full time faculty members are frathematics educators, four statisticians, fapplied mathematics aimedpure mathematicians with varying specialties including (but not limited to) graph theory, discrete mathematics, analysis bally is bally apploy, operator theory algebraigeometry and number heory.

C.

include (but are not limite)dpt

2. THE MASTER of EDUCATION in MATHEMATICS PROGRAM at MILLERSVILLE UNIVERSITY

A. OBJECTIVES

Themajor strength of the M.Ed. program in Mathematics at Millersville University is the balance of mathematics content and pedagogy. Since undergraduate programs in mathematics education vary greatly, one goal of the M.Ed. is to enhance attes' mathematical content knowledge. Additionally, the program offers a variety of mathematics education courses that allow graduate students to investigate nature, teaching, and learning of mathematicaphythisimmediately theirownmathematics classrooms.

B. ADMISSION REQUIREMENTS – UNIVERSITY LEVEL

Admission to a graduate program is granted without regard to race, color, national origin, sex, or religion creed, but with regard to ability **adflect** record sufficiently strong to support confidence that the applicant can participate effectively in the graduate community and creditably complete the program or study for which application is made.

ADMISSION TO A MASTER'S DEGREE PROGRAM

Admission decisions are based upon a combination of fair tous the agrade point average the recommendation from those able to critically assess an applicast scale did tynta graduate program, a written statement of purpose, standard is a with those and the proposed field applicant's interests as matched with those and the with those and the matches appropriate, a successful intervie (An interview is not required for admission to the M.Ed. in Mathematics Education.

REGULAR ADMISSION

To be eligible for regular admission, an applicant must have earned a bachelor's degree from an accrefouryear college or university in the United States or equivalent from a similar institution abroad. The applicant must demonstriate opinion of the faculty and the dean of graduate studies, the ability to successfully complete a master's degree, and must have achieved at least a 2.75 undergraduate grad point average in all coursework attempted otherwise specified bactate mic program).

PROBATIONAL ADMISSION

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C. ADMISSION REQUIREMENTS – MATHEMATICS DEPARTMENT LEVEL

Admission to the M.Ed. program in mathematics education is granted to those applicants whose mathematical preparation fulfills the mathematical proficiency requirement (see I below). This is usuall accomplished through the successful completion of a rigorous course of study culminating in the award of a Bachelor's degree in mathematics. Conditional admission is granted to those applicants who have satisfactorily completed the following MU undergraduate mathematics comprises on the *interfactorily* and *III*) and MATI(LB22) ar Algebra). Such persons are granted full admission status upon fulfillment of the mathematice requirement.

D. APPLICATION PROCEDURE

Prospective students may apply electronically by visiting the Millerswibe site datat www.millersville.edu/ graduate. Epplacation to be considered complete, the following must also be

F. COURSE OF STUDY

III. Mathematics courses (12 semester hours minimum required)

IV. Mathematics Education Courses (9 semester hours minimum required)

Three (3) of the following:

MATH 603 Equity Issues in Mathematics Education (3) MATH 603 History of Mathematics (3) MATH 606 Transitioning to the First Year iNeeds bhool Districe) MATH 607 Moving to Tenure (3) MATH 610 Problem Solving Seminar (3) MATH 611 Psychology of Learning Mathematics (3) MATH 612 Diagnostic and Prescriptive Mathematics (3) MATH 614 Current Issues in Middle School Mathematics (3) MATH 615 Current Issues in Secondary School Mathematics (3) MATH 616 Teaching Advanced Placement (AP) Calculus in Secondary School (3) MATH 617 Curricular Innovations in Middle & Secondary School Mathematics (3) MATH 618 Assessment in the Mathematics Classroom (3) MATH 619 Advanced Perspectives for Teaching High School Mathematics (3) MATH 622 Teaching Mathematics int Chen201ry (3) MATH 672 Mathematical Modeling in the Secondary School Curriculum (3) MATH 679 Using Technology in Secondary School Mathematics (3) MATH 690 Topics in Discrete Mathematics for Teachers (3) MATH 697 Topics in Mathematics Education (3) MATH 698 Independent Study in Mathematics EdBcation (1-

NOTE Students may elect MATH 697 or 698 more than once, provided that the topics are different.

V. Degree Qualifying Review – Degree Candidacy

Degree candidacy will be granted to those studeante admonpleted at leasternester hours of course worksward the programith Bor higher, and an overall GPA asta8le.

VI. Final Options (Select One)

1. <u>Non-Thesis</u> (6 semester hoursinimum required) Elect two (2) courses offered by the department at the 510 level or higher. The minimum course requirement for the degree with this option is 36 semester hours.

o NOE: MATH 535 may not be doobleted in categories II and VI.

2. <u>Thesis</u> (3 semester hourns inimum required)

MATH 699 Thesis

o NOTEThe minimum course requirement for the M.Ed. in Mathemationist Eduisatipation is 30 semester hours plus thesis (3 or more credits).

VII. Additional Program Requirements
1.<u>Required Field Experi</u>ence

Thesis ____; or

Research Project in Math Educ _____.

2. Required Capstone

Thesis____; or

Comprehensive Oral Presentation _____.

3. COURSE DESCRIPTIONS – GRADUATE-LEVEL MATHEMATICS COURSES

a. MATHEMATICS COURSES

MATH 502 Linear Algebra for Teachers (4)

Systems of linear equations, matrix algebra, and determinants; real vector spaces, linear independence basis and dimension; real inner product spaces; horizon thogonalization; eigen theory and diagonalization; linear transformations taixed epresentation.

MATH 503 Probability and Statistics for Teachers (4)

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Samplef recent offering/sMATH 695:

o <u>Nonlinear Dynamical Systems</u> (2009) Dynamical systems model the time evolution of systems. Examples are abundant in physics, biolog and chemistry well as social sciences. This course will mainly focus on dynamical systems induced by (mostly, nonlinear) ordinary differential equations. We will start with one dimensional problems a move on to the (elegant) theory of two dimensional dynamications, and the Redix scandtheory differential plane analysis, stability theory, bifurcation analysis, and the Redix scandtheory differential

b. MATHEMATICS EDUCATOONIRSES

MATH 602 Equity Issues in Mathematics Education (3)

This course is designed for students with an interest in equity issues in mathematics education. In this course, we examine issues of equity in mathematics education from various theoretical and practical perspectives and along lines of race, gender, culture, and socioeconomic statuintensiværeading-course that spans such topics as the achievement gap, trackinglevaltupællyagogy,

multiculturalism, the nature of mathematics for democracy and social justice. Course assignments primarily involve presentations, discussions, writing, problem solving, and problem posing Some assignments will be differentiated to ensure they are relevant to the hcpractions of bot teachers as well as students without a teaching background that intend to pursue further graduate stude Offered periodically.

MATH 603 History of Mathematics (3)

Evolution of mathematical concepts from antiquity to the present century. Emphasis on eras of great mathematical a5m4(aIMC /P <</MCID 4 >IMC /P <1 Tf 0.00)87.8cnnT /P . /P y a 0.004 Tc w -36.a 0

4. SAMPLE PROGRAMS

Moststudents enrolled in the Master of Education in Mathematics Program at Millersville University complete the majority of their **covorseturing** the summer months. Currently, there are three summer sessions. Two or three graduate courses in mathematics or mathematics education are typically offered duringeach of the sessions 2 and the two outlines below indicate how one can complete the program overthree consecutive summers. Graduate courses faceed periodically in the evening thering Fall and Spring semesstellowing fadditional flexibility pon acceptance to the program, students are encouragetod sketch outpean of study ith their advisor.

Full-time Summer (3 years) – Non-thesis Option, 36 credits (proficiencies met on entry) Year 1 Summer 2 Summer 3 MATH 502 **MATH 505** EDFN 601 (MATH 535) **MATH 645** Year 2 Summer 2 Summer 3 **MATH 670 MATH 603 EDFN 604 PSYC 525** Year 3 Summer 2 Summer 3 **MATH 610** MATH 611 **MATH 672 MATH 693** Full-time Summer (3 years) – Thesis Option, 30 credits (proficiencies met on entry) Year 1

Summer 2 MATH505 EDFN 601	<u>Summer</u> 3 MATH592 MATH 645
Year 2	
Summer 2	Summer 3
MATH 675	MATH616
EDFN511	EDFN545
	Thesis planning

Year 3	
Summer 2	Summer 3
MATH679	MATH 699 (Thesis credits)
MATH615	

Masters of Education in Mathematics (M.Ed. Major Sequence and Degree Requirements)

Requirements: minimum 33 -36 semester hours

I. Required Mathematics Proficiency	IV. Mathematics Education Courses (minimum 3
	courses)
degree. Students who enter the program having earned at	МАТН
least a B- in the following undergraduate courses (or their	······································
equivalent) are considered to have met this requirement:	MATH
and Statistics	МАТН .
x MATH 322 Linear Algebra I	
x MATH 345 Abstract Algebra I	NOTE:
x MATH 464 Real Analysis I	than once, provided that the topics are different.
x MATH 353 Survey of Geometry	
or	V. Degree Qualifying Review
x MATH 355 Transformational Geometry	Degree condident will be greated to these students wi
II. Professional Core (3 courses)	have fulfilled the mathematioficiency requirement
	and have completed at lease 204 ster hours of
1 EDFN 601 or MATH 535	course work at the 510 level or higher with grades of A
and	B, including one course from each of categories
	above.
2.PSYC or EDFN	VI Final Ontions (Select One)
and	
	Option 1. <u>NonThesi</u> ≰6 semester hours
3.EDFN	minimum required)
	МАТН
III. Mathematics courses (minimu m 4 courses)	······································
At least 6 s.h. numbered 510 or higher:	MATH
MATH	Option 2 Thosid's compostor hours minimum
	required)
WATH	MATH 699 Thesis
MATH	
МАТН	VII. Additional Program Requirements
······································	1 Paguirad Field Experience
NOTES:	
x MATH 535 may not be double-counted under blocks II. III. or VII.	
x Credits earned in 50X-numbered courses may be	Thesis; or
applied in block III provided the student earns a	Research Project in Math Educ
grade of A of B. x Students may elect MATH 695 or 696 more than	2. <u>RequireCapston</u> e
once, provided that the topics are different.	Thesis : or
	Comprehensive Oral Presentation

I. Required Mathematics Proficiency

Demonstrated mathematical proficiency is required for the degree. Students who enter the program having earned a grade of A or B in the following undergraduate courses (or their equivalent) are considered to have met this requirement:

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6. GRADUATE FACULTY

Schultz, Delray J. (Department Chairperson).

Ph.D, Temple University, 1992. Statistics, Operations Research. White, Janet A. (Assistant Department Chairperson).

Ph.D, American University, 2002. Mathematics Education. Washington, Tyrone (Graduate Program Coordinator)

Ph.D., North Carolina State University, 2012. Mathematics Education.

Blum, Dorothee J. Ph.D, Virginia Polytechnic Institute and State University, 1982.

Discrete Mathematics, Graph Theory, Combinatorics

Buchanan, J. Robert. Ph.D. North Carolina State University, 1993. Applied Mathematics.

Cardwell, Antonia E. Ph.D. Kent State University, 2005. Analysis

Catepillán, Ximena. Ph.D. University of Iowa, 1991. Operator. Theory

Fenwick, James W. Ph.D. University of Wyoming, 1985. Statistics.

Han, Zhigang. Ph.D., Stony Brook University, 2006. Geometry, Topology

Heitmann, Noel F. Ph.D.University Pittsburgh, 2003. Applied Mathematics.

Ikenaga, Bruce M. Ph.D. Cornell University, 1982. Algebra.

Ma Baoling. Ph.D.University of Louisianatayette 2012, Applied Mathematics.

Moss, Erin R. Ph.D., Purdue University, 2009. Mathematics Education.

Robinson, Kevin S. Ph.D. University of Floria@00Applied/Industrial Statistics

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Shao, Zhoude. Ph.D. University of Minnesota, 1994. Applied Mathematics.

Shoemaker, Lewis H. Ph.D. Pennsylvania State University, 1988ticSta

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