

**Department of Mathematics**  
**Ph. D in Mathematics Education**  
**Program Assessment Plan**  
(modified August 2011)

**Program Mission**

The primary mission of the Ph.D. Program in Mathematics Education at Illinois State University is to prepare individuals for careers as college or university professors in Schools of Education or in Departments of Mathematics where their primary responsibilities will be to conduct and direct basic research on the teaching and learning of school mathematics (K-12), to teach courses to prospective teachers, and to carry out K-12 mathematics staff development with practicing teachers. Graduates are also qualified to assume positions as mathematics curriculum consultants or supervisors in school districts, researchers in educational laboratories, and staff members in educational publishing companies.

**Program Goals**

The Ph.D. in Mathematics Education program has the following three broad goals:

- To encourage students to appreciate and understand the history and research literature related to the teaching and learning of mathematics.
- To prepare graduates for the teaching responsibilities typically expected of mathematics education faculty; specifically, to teach mathematics content and pedagogy courses to prospective teachers and to conduct professional development with K-12 mathematics teachers.
- To prepare students to formulate and investigate questions seeking new knowledge related to the teaching and learning of mathematics.

**Methods of Assessment**

Specific student outcomes have been identified for each program goal and a number of direct measures are used to assess student performance related to those outcomes. These include papers, presentations, and exams in courses, comprehensive/preliminary exams, and completion of the dissertation.

Additionally, three indirect assessment methods are used to inform the process. Copies of each are attached as an appendix.

- Alumni Survey: An online survey is sent to graduates 3 years after graduation (started in 2011).
- Doctoral Student Progress Report: Each year, instructors of doctoral students are asked to complete a progress report for each student they taught.
- Reflection on Annual Progress: Each year, students who are taking courses are asked to comment on their growth and development and to discuss any challenges they are encountering in the program.

An overview chart is presented below.

<b>Program Goal</b>						
The Ph.D. in Mathematics Education program encourages students to appreciate and understand the history and research literature related to the teaching and learning of mathematics.						
<b>Outcome(s)</b>	<b>Data Needed</b>	<b>Data Already Available</b>	<b>What group(s) will be assessed?</b>	<b>Assessment Methods</b>	<b>Who will conduct assessment?</b>	<b>Timeline</b>
Students will be skilled in reading, interpreting, and evaluating research in general, and specifically related to the teaching and learning of mathematics.	<p>Course grades in MAT 401, 404, 581, 585, and EAF courses (e.g., 410, 415, 510)</p> <p>Record of comprehensive/preliminary exam performance</p>	Yes	<p>All doctoral students enrolled in coursework</p> <p>Students taking comprehensive/preliminary exam</p>	<p><b>DIRECT:</b> course papers, projects, and exams; comp/prelim exam performance</p> <p><b>INDIRECT:</b> Doctoral Student Progress Report, Reflection on Annual Progress</p>	<p>Course instructors, Ph.D. Director collects data for review by Ph.D. Committee members</p> <p>Comp/prelim committee members</p>	Annual
Students will understand the historical forces that have influenced mathematics education.	<p>Course grades in MAT 404, 580, 581, 582, 585, 586</p> <p>Record of comprehensive/preliminary exam performance</p>	Yes	<p>All doctoral students enrolled in coursework</p> <p>Students taking comprehensive/preliminary exam</p>	<p><b>DIRECT:</b> course papers, projects, and exams; comp/prelim exam performance</p> <p><b>INDIRECT:</b> Doctoral Student Progress Report, Reflection on Annual Progress</p>	<p>Course instructors, Ph.D. Director collects data for review by Ph.D. Committee members</p> <p>Comp/prelim committee members</p>	Annual

<b>Program Goal</b>						
To prepare graduates for the teaching responsibilities typically expected of mathematics education faculty; specifically, to teach mathematics content and pedagogy courses to prospective teachers and to conduct professional development with K-12 mathematics teachers.						
<b>Outcome(s)</b>	<b>Data Needed</b>	<b>Data Already Available</b>	<b>What group(s) will be assessed?</b>	<b>Assessment Methods</b>	<b>Who will conduct assessment?</b>	<b>Timeline</b>
Students will understand and apply the basic psychological and developmental principles of teaching mathematics for the grade levels associated with their selected program option (K-9, K-12).	Course grades in MAT 402, 403, 404, 406, 580, 582, 586	Yes	All doctoral students enrolled in coursework	DIRECT: course papers, projects, and exams  INDIRECT: Doctoral Student Progress Report, Reflection on Annual Progress	Course instructors, Ph.D. Director collects data for review by Ph.D. Committee members	Annual
Students will possess broad knowledge of mathematics content needed to educate prospective teachers, in-service teachers, and supervisors of mathematics.	Course grades in graduate-level mathematics content classes at ISU (e.g., MAT 421, 422, 320, 321)	Yes	All doctoral students enrolled in coursework	DIRECT: course papers, projects, and exams  INDIRECT: Doctoral Student Progress Report, Reflection on Annual Progress	Course instructors, Ph.D. Director collects data for review by Ph.D. Committee members	Annual
Students will develop, implement, and evaluate programs for prospective teachers, inservice teachers, and supervisors of mathematics.	Course grades in MAT 582, 586  Record of comprehensive/ preliminary exam performance	Yes	All doctoral students enrolled in coursework	DIRECT: course papers, projects, and exams; comp/ prelim exam performance	Course instructors, Ph.D. Director collects data for review by Ph.D.	Annual

			Students taking comprehensive/preliminary exam	INDIRECT: Doctoral Student Progress Report, Reflection on Annual Progress	Committee members Comp/prelim committee members	
Students will demonstrate understanding of current theories of learning mathematics.	Course grades in MAT 403, 580  Record of comprehensive/preliminary exam performance	Yes	All doctoral students enrolled in coursework  Students taking comprehensive/preliminary exam	DIRECT: course papers, projects, and exams; comp/prelim exam performance  INDIRECT: Doctoral Student Progress Report, Reflection on Annual Progress	Course instructors, Ph.D. Director collects data for review by Ph.D. Committee members  Comp/prelim committee members	Annual
Students will understand basic principles that influence the development, implementation, and evaluation of mathematics curricula.	Course grades in MAT 582, 586  Record of comprehensive/preliminary exam performance	Yes	All doctoral students enrolled in coursework  Students taking comprehensive/preliminary exam	DIRECT: course papers, projects, and exams; comp/prelim exam performance  INDIRECT: Doctoral Student Progress Report, Reflection on Annual Progress	Course instructors, Ph.D. Director collects data for review by Ph.D. Committee members  Comp/prelim committee members	Annual

**Program Goal**

The Ph.D. in Mathematics Education program prepares students to formulate and investigate questions seeking new knowledge related to the teaching and learning of mathematics.

<b>Outcome(s)</b>	<b>Data Needed</b>	<b>Data Already Available</b>	<b>What group(s) will be assessed?</b>	<b>Assessment Methods</b>	<b>Who will conduct assessment?</b>	<b>Timeline</b>
Students will be involved in research projects conducted by faculty members.	Completion form for MAT 583: Professional Project	Yes	All Ph.D. candidates	DIRECT: Research paper, presentation  INDIRECT: Doctoral Student Progress Report	Faculty members directing professional projects and program director	Annual
Graduates will have designed, conducted, and reported original research.	Outcome of Dissertation Defense form  Copy of dissertation	Yes	Ph. D candidates who defend dissertations	DIRECT: Dissertation	Dissertation director and committee members	Annual

### **Implementing and Using Assessment Data**

All assessment data are collected by the Ph.D. program director and analyzed to identify program strengths and areas for improvement. Data/findings are presented for review and discussion to the members of the Ph.D. Committee, a departmental committee that meets at least once each semester. Issues related to the Ph.D. program or points for discussion arising in Ph.D. committee meetings are brought to the entire faculty at Department meetings or, more typically, at a meeting of the Group for Educational Research in Mathematics (GERM). GERM meetings are scheduled weekly throughout the semester and are attended by mathematics department faculty and graduate students. Several meetings each year are designated for the discussion of programmatic issues.

Also, the program director meets annually with each doctoral student to share a synthesis of the Doctoral Student Progress Report data from each of their instructors and to discuss the student's reflections on the program. These meetings (in addition to students' written reports) provide insights into what students perceive as strengths of the program and sometimes highlight issues that need to be examined by Ph.D. committee members.

## APPENDIX: INDIRECT ASSESSMENT MEASURES

### **Ph. D. in Mathematics Education Reflection on Annual Progress**

*The primary mission of the Ph.D. program in mathematics education at Illinois State University is to prepare individuals for careers as college or university professors in Schools of Education or in Departments of Mathematics where their primary responsibilities will be to conduct and direct research on the teaching and learning of school mathematics and teach courses to prospective and in-service mathematics teachers. Graduates will also be qualified to assume positions as mathematics curriculum consultants in school districts, researchers in educational laboratories, or staff members in educational publishing companies. The Ph.D. program is designed to produce individuals who have the knowledge, competencies, and skills which enable them to (1) conduct, direct, and evaluate research related to the teaching and learning of school mathematics, (2) educate prospective and in-service teachers on the principles of teaching and learning mathematics, and (3) develop and evaluate mathematics curricula.*

1. Reflect on your doctoral studies this academic year. How have you grown and developed? What challenges have you faced? Consider the following areas:
  - Coursework (e.g., writing skills, ability to interpret and synthesize literature, mathematical understanding, communication skills)
  - Teaching or research experiences related to your assistantship (if applicable)
  - Progress toward research goals—professional project or dissertation
2. Describe any concerns or suggestions you have about the Ph.D. program.

## Ph. D. in Mathematics Education

### Progress Report for \_\_\_\_\_ (doctoral student)

*The primary mission of the Ph.D. program in mathematics education at Illinois State University is to prepare individuals for careers as college or university professors in Schools of Education or in Departments of Mathematics where their primary responsibilities will be to conduct and direct research on the teaching and learning of school mathematics and teach courses to prospective and in-service mathematics teachers. Graduates will also be qualified to assume positions as mathematics curriculum consultants in school districts, researchers in educational laboratories, or staff members in educational publishing companies. The Ph.D. program is designed to produce individuals who have the knowledge, competencies, and skills which enable them to (1) conduct, direct, and evaluate research related to the teaching and learning of school mathematics, (2) educate prospective and in-service teachers on the principles of teaching and learning mathematics, and (3) develop and evaluate mathematics curricula.*

Reflect on your interactions with this student with regard to his or her academic progress. Please consider the following, as applicable, in your assessment of the student's strengths and weaknesses:

- Coursework: writing skills, ability to interpret and synthesize literature, time management skills, mathematical understanding
- Social interactions: communication skills, class participation, collegiality
- Progress toward research goals (professional project or dissertation)



## Ph.D. Alumni Survey

1. Name (Optional):
2. Month and Year of Graduation:
3. Sequence:  
    K-9  
    K-12

*For items 4 through 13, response choices include: Very Positive, Positive, Somewhat Positive, Neutral, Somewhat Negative, Negative, Very Negative*

4. Which best describes your current attitude toward ISU ?
5. Which best describes your attitude toward the Ph. D. program?
6. Which best describes your attitude toward course offerings the Ph.D. program?
7. Which best describes your attitude toward the quality of teachers and instruction in the Mathematics Department?
8. Which best describes your attitude toward advisement in the Ph.D. program?
9. Which best describes your attitude toward course requirements in the Ph.D. Program?
10. Which best describes your attitude toward intellectual challenges in the Ph.D. program?
11. Which best describes your attitude toward awareness of career opportunities?
12. Which best describes your attitude toward employment opportunities upon graduation?
13. Which best describes your attitude toward your experience in the Ph.D. in Mathematics Education program overall?

*For items 14 through 19, response choices include the following:*

- *The preparation was excellent. The goal was addressed in multiple settings and in meaningful ways throughout the program.*
  - *The preparation was more than adequate. This goal was addressed several times in meaningful ways in the program.*
  - *The preparation was adequate. This goal was addressed at least once in a meaningful way in the program.*
  - *The preparation was inadequate or poor. This goal was addressed in minor or superficial ways in the program.*
  - *The preparation was extremely poor. This goal was not addressed at all in the program.*
14. GOAL 1: Graduates will be skilled in conducting, directing, and evaluating research related to the teaching and learning of mathematics.
  15. GOAL 2: Graduates will understand and apply the basic psychological and developmental principles of teaching mathematics for the grade levels associated with their selected program option (K-12 or K-9).
  16. GOAL 3: Graduates will possess broad knowledge of mathematics content needed to educate prospective and in-service teachers for the grade levels associated with their
  17. GOAL 4: Graduates will be able to develop, implement, and evaluate programs for prospective teachers, in-service teachers, and supervisors of mathematics.
  18. GOAL 5: Graduates will understand the historical forces that have influenced mathematics education.
  19. GOAL 6: Graduates will understand basic principles that influence the development, implementation, and evaluation of mathematics curricula.
20. Please provide comments or suggestions.