Ph.D. in Curriculum & Instruction with a major in Mathematics Education

The major in Mathematics Education is intended to prepare graduates for work in mathematics teacher education and mathematics education research. There are three specific profiles of applicants that the program is designed to serve:

**Undergraduate Mathematics Education**
The applicant has already completed a Master’s degree in Mathematics or Statistics. The applicant has significant experience teaching mathematics. K-12 teaching experience is preferred but not required. Coursework will emphasize theory, research methods, and study of mathematics education literature, and may include additional graduate mathematics coursework. Students will typically focus on research in undergraduate or secondary mathematics education. Successful graduates who fit this profile should be competitive for positions as mathematics educators in mathematics departments.

**Secondary Mathematics Education**
The applicant has substantial experience teaching middle or high school mathematics as a full-time classroom teacher. The applicant also has substantial coursework in undergraduate mathematics, having successfully completed at least 4 courses in mathematics beyond Calculus III with grades of “B” or better. Coursework will include graduate courses in mathematics, as well as courses in research methods, curriculum theory, etc. Students will typically focus on research in secondary (e.g., Grades 6–12) mathematics education. Successful graduates who fit this profile should be competitive for positions as mathematics educators in either mathematics departments or schools of education.

**Middle Grades Mathematics Education**
The applicant has substantial experience teaching K-12 mathematics. The applicant may or may not have completed substantial coursework in undergraduate mathematics but has completed at least Calculus II with a grade of “B” or better. Coursework will include mathematics content courses designed especially for teachers, as well as courses in research methods, theory, etc. Students will typically focus on research in K–8 Mathematics Education. Successful graduates who fit this profile should be competitive for positions as mathematics educators in schools of education.

All applicants must have completed a Bachelors or Masters degree with a minimum 3.0 GPA. All applicants must take the GRE. Target scores are as follows:
Verbal: 153 or higher; Quantitative: 149 or higher; Writing: 3.5 or higher.
International applicants must have TOEFL scores that meet university requirements.

Application materials must include the following:

1. Curriculum vitae
2. Personal Statement: In no more than 500 words, describe why this degree/major meets your intended professional goals and research interests. Address how your prior experience relates to the pursuit of the degree.
3. Letters of reference: Submit three letters, at least one of which should come from a former professor. Letters should be relevant to the major.
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4. Writing sample: Submit a recent writing sample of a paper you have written. It is acceptable to submit a paper that was written for a class or one that has been published.

5. Response to one of the following prompts addressed in a short paper (500-1000 words, 12-point font, double-spaced with one-inch margins).

**Prompt #1.** Choose a scenario in which you worked with a student in a classroom setting, tutoring situation, or interview. Contextualize the interaction by describing relevant information about the student and the student's thinking in general. Describe a particular interaction with the student in detail (e.g., describe a problem that you posed to the student, and describe how the student approached the problem). Then analyze the student's thinking: Why do you suppose the student responded in that way? What did you learn about the student's thinking from this interaction? Given what you learned, what next move could you make to help encourage progress in the student’s understanding of the mathematics?

**Prompt #2.** Describe a recent mathematics professional development experience in which you participated. In your description include the goals of the experience/program, the reasons you elected to participate, and the range of activities included in the experience/program. Then, explain (in detail) how you have or how you plan to incorporate what you learned/experienced into your mathematics teaching to improve students’ mathematics learning. Finally, describe what was absent from your recent professional development experience; that is, what do you now realize you needed to be included in the experience? What could the facilitators have done or included to improve the professional development experience with regard to implementation and use with mathematics learners?

**Prompt #3.** As teachers we must be able to develop or adapt curriculum to meet the needs of our students. Moreover, we are challenged to develop authentic, reliable and valid methods of assessment as well as integrate and meet the goals of state mandated standards. Curriculum development is a formidable task, as teachers must take into consideration several elements when planning meaningful and purposeful learning. How is content planned and implemented in your classroom? What is/should be considered in order to develop curriculum? How are instructional goals balanced with individual student needs in your classroom? How are national documents such as NCTM’s *Principles and Standards for School Mathematics* and the Common Core State Standards for Mathematics reflected in your curriculum? How are student centered instruction and other pedagogical strategies put into practice with regard to mathematics? Give specific examples to support your response.
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## Requirements for the Doctorate in Curriculum and Instruction (Minimum 65 credit hours)

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<th>Category</th>
<th>Description</th>
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| **Interdepartmental Core (9 credits)** | **Interdepartmental Core (9 credits)**  
- Curriculum Theory (3)  
- Learning Theory (3)  
- Policy Studies (3)  

  **EDG 6221 Curriculum Theory**  
  **See list provided by advisor**  
  **See list provided by advisor** |
| **Seminars (minimum of 2 credits)**   | **Seminars (2 credits)**  
EDG 6008 (1 credit) Academic and Professional Identity  
Other seminars are based on topics identified by faculty based on student interest. Topics might include but are not limited to:  
- Action Research (1 credit)  
- Grant Writing (1 credit)  
- Online Teaching/Learning (1 credit)  
- Program Evaluation (1 credit) |
| **Research Methods Core (minimum of 15 credits)** | **Research Methods Core (courses to select from)**  
- EDF 5400 Basic Descriptive & Inferential Statistics Applications (4)  
- EDF 5401 General Linear Modeling Applications (4)  
- Advanced Quantitative Methods (e.g., EDF 5402 Advanced Topics in Analysis of Variance Applications (3); EDF 5406 Multivariate Analysis Applications (3); EDF 5409 Nonparametric Analysis Applications (3); EDF 6937 Seminar in Advanced Research Problems-HLM (3)  
- EDF 6499 Discourse and Conversation Analysis (3)  
- EDF 6475 Qualitative Methods in Educational Research (3)  
- EDF 6476 Advanced Qualitative Research Seminar (3)  
- EDF 6479 Qualitative Data Analysis (3)  
- Others as approved by advisory committee |
| **Major (32-35 credits)**             | **Mathematics Education Concentration (min. 17 credits)**  
- MAE 6xxx Curriculum, Standards and Assessment (3)  
- MAE 6939 Mathematics Teacher Education (3)  
- MAE 6xxx Recent Developments and Current Issues in Mathematics Education (3) (may be repeated)  
- MAE 6797 Advanced Seminar on Research in Mathematics Education (4)  
- Supervised Research (min. 2 credits)  
- Supervised Teaching (min. 2 credits) |
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- Other courses as identified by supervisory committee

**Minor Concentration** (15 - 18 credits)
Courses selected in areas such as:

- Mathematics, K-8 (elementary & middle grades)
- Mathematics, History & Philosophy of Mathematics
- Educational Policy
- Secondary and Post-Secondary Education
- RUME (Research in Undergraduate Mathematics Education)

Individuals lacking significant graduate level mathematics coursework (i.e., at least 18 hours) will be expected to complete additional mathematics coursework. Examples of courses include:

- Abstract Algebra (e.g., MAS 5307, MAS 5308, MAS 5311)
- Analysis (e.g., MAA 5306, MAA 5307, MAA 5406, MAA 5407)
- Applied Mathematics (e.g., MAD 5403, MAD 5404, MAP 5165)
- Topology (e.g., MTG 5326, MTG 5327)
- Special Topics in Mathematics (e.g., Applied Graph Theory, Game Theory, Dynamical Systems; as available and typically offered in summer terms)

| **Dissertation Research** (24 credits) | **Dissertation Research** Includes satisfactory completion of a preliminary written exam, dissertation, and an oral defense of the dissertation.  
MAE 6980 Dissertation (min 24 credits) |