

PhD in Mathematics

Our PhD programs are designed primarily to prepare leaders in mathematics education research. In the Department of Mathematics, Mathematics Education is viewed as another branch of mathematics to research, like Analysis or Mathematical Physics. All degree requirements for the PhD in Mathematics apply. Students establish a broad base in advanced mathematics and then take specially designed graduate courses for research in mathematics education, including the following:

Mathematics Education Courses (12 credit hours)

- Research on Mathematical Knowing & Learning (MATH 5624)
- Research in Undergraduate Mathematics Education (MATH 5634)
- Critical Analysis of Mathematics Education Research (EDCI 5734)
- Advanced Topics in Mathematics Education (EDCI 5714)

5000-Level Mathematics Courses (21+ hours)

In addition to MATH 5624 & 5634, PhD students must complete at least 21 credit hours of 5000-level mathematics courses. MATH 4225 & 4226 (Abstract Algebra), 4124 (Real Analysis), and 4445 (Numerical Analysis) should be taken if not in the student's background.

Research Methods Courses (12+ hours)

PhD students are expected to develop proficiency in both qualitative and quantitative methods, regardless of which methods they plan to use in their dissertation studies. Appropriate sequences include the following:

Qualitative Research Methods

- *Sequence option 1*: EDRE 6504-6524
- *Sequence option 2*: EDRE 6504-ENGE 5714

Quantitative Research Methods

- *Sequence option 1*: EDRE 6605-6606
- *Sequence option 2*: EDRE 6606-6634 (Advanced Statistics for Educators)
- *Sequence option 3*: STAT 5615-5616

Advanced Research Methods Courses

- Advanced Issues in Qualitative Research (EDRE 6784)
- Advanced Statistics in Education (EDRE 6634)
- Hierarchical Linear Modeling (EDRE 6694)
- Mixed Method Research Design (EDRE 6744)

Additional Courses

Additional courses (e.g., Methods, Psychology, Philosophy, Education) may be taken to support the student's dissertation research. Such courses would be determined by the student and their program committee and might include the following:

- Cognitive Processes & Educational Practice (EDEP 6114)
- Sociocultural Influences on Learning & Instruction (EDEP 5784)
- Constructivism in Education (EDEP 6224)
- Motivation & Cognition (EDEP 6444)
- STEM Education Research (EDCI 5834)
- Education & Anthropology (EDCI 6034)
- Cognitive Development (PSYC 5544)
- History of the Philosophy of Science (PHIL 6314)

Research/Dissertation Hours (30 - 60 credit hours)

These are credits that the student would earn each semester for independent work on research and dissertation.

Other Requirements

- Preliminary Written Examinations (2), as required by the Department of Mathematics for all PhD students.
- Presentation of prospectus for dissertation on a suitable research topic in mathematics education
- Written dissertation
- Oral defense of dissertation

Blacksburg Campus

This degree program is offered at the Blacksburg campus. The Blacksburg campus offers students the full services of the university, including an extensive library, technology support, and the Graduate Life Center.