MATHEMATICS EDUCATION (MA)

Master of Arts

Not accepting applications at this time.

This program is offered by AU Online.

Program Description

This is a unique program designed for mathematics teachers or for those who wish to teach mathematics. The program requires basic mathematics knowledge, including a course in calculus.

The program focuses on deepening the participants' understanding of mathematical concepts and the connections among the various branches, so they are understood as a coherent whole through the K–12 mathematics curriculum. It is designed to introduce teachers to the development of mathematical content standards through the grade levels. It seeks to train them to develop and implement standards-based curricula with deep connections to both previous and later mathematical study. The program further emphasizes effective mathematical reasoning and the development of mathematical reasoning and behaviors in the K-12 curriculum. The content courses are designed to increase the participants' self-efficacy with school mathematics and higher-level mathematics and to enhance their teaching with additional depth and breadth of content. Each course integrates teaching methods and content seamlessly and emphasizes the pedagogy of the particular course content.

The program trains participants to implement knowledge gained in each course in their own classroom by emphasizing the creation of new lesson plans and learning activities aligned with advanced mathematics content and practices. The program increases teachers' confidence and helps prepare them to become leaders and advocates for mathematics and science education in their own school and district.

Program Goals

- Train teachers to design and implement curriculum based on mathematics content and practices standards
- Help teachers understand the mathematics curriculum for K–12 as a coherent continuum and see mathematics branches as parts of an integral whole
- Deepen teachers' understanding of mathematics content knowledge by focusing on concepts and reasoning
- Help teachers understand and present mathematics as a modeling and a problem- solving technique in a STEM context
- Improve participants' teaching skills by presenting content and teaching methods seamlessly and emphasize the pedagogy of the content
- Increase teachers' confidence by training them to become reflective teachers and use educational research to assess and improve their own teaching
- Increase the focus of participants on improving attainment in their students so they understand, apply and retain mathematics knowledge over time by
- Designing and delivering lessons aligned with mathematics content and practice standards

- Presenting a mathematical topic as a part of a coherent whole and connect it to other branches of mathematics as well as other disciplines
- Focusing on explaining mathematics and science reasoning, and the concepts that lead to the use of a certain procedure to solve a given problem
- Presenting mathematics as a problem-solving technique in a real world context.
- Using technology, online resources, and manipulatives appropriately and effectively
- Reviewing and implementing latest research in mathematics education
- Identifying specific weaknesses students have in solving mathematics problems

Program Requirements

Not accepting applications at this time.

Code	Title	Credits
Required Courses in Mathematics		
MTH-5010	Numbers and Mathematical Thinking	3
MTH-5020	Statistics and Probability	3
MTH-5030	Understanding and Teaching Algebra	3
MTH-5040	Understanding and Teaching Geometry	3
MTH-6010	Calculus Concepts and Applications I	3
MTH-6030	Applications in STEM	3
MTH-6060	Calculus Concepts and Applications II	3
Select six semester hours of the following:		6
MTH-6020	Mathematical Connections	
MTH-6040	Technology in Mathematics Classrooms	
MTH-6810-9	Selected Topics in Mathematics	
Required Courses in Mathematics and Science Education		
NSM-5400	Curriculum Development and Assessment in Mathematics and Science	3
NSM-5900	Field Experience in STEM	1
NSM-6100	Educational Research in Mathematics and Science I	3
NSM-6200	Educational Research in Mathematics and Science II	3
Total Credits		**37**

Graduate Degree Requirements

a. Completion of all coursework specified by the graduate program.
b. Cumulative GPA of at least 3.0 on a 4.0 scale, or higher if specified by the graduate program.
c. Submission of all pre-graduation materials required by the graduate program.
d. Acceptance of thesis or other required final project by the graduate program.
e. Submission of two copies of approved thesis or project in a specified form together with payment of binding fee where applicable.
f. Submission of Application for Graduation and payment of any graduation fees assessed by the university.
g. In the case of certification programs, submission of all governmental forms.

h. Residency Requirement: A minimum of 25% percent of the total credits required for the completion of the graduate degree or post-baccalaureate certificate or credential must be earned at Aurora University. Individual programs may establish more extensive residency requirements, including requirements that specific coursework be completed at Aurora University.

Learning Outcomes

a. **Mathematical Understanding**
    i. Working understanding of basic insights and methods in a broad variety of mathematical areas
    ii. Clear understanding of key concepts and reasoning
    iii. Application of mathematics in a broader STEM context
b. **Educational Principles**
    i. Working understanding of Mathematical Practices
    ii. Ability to use technology and online resources appropriately and effectively
c. **Written Communication**
    i. Clear and precise formulation of definitions and theorems
    ii. Efficient and coherent presentation of arguments in the form of proofs and/or data
    iii. Organization of individual results into a coherent conclusion or theory
d. **Research Skills**
    i. Searching the literature
    ii. Reading and understanding of mathematical research (definitions and statements of results)
    iii. Organizing information from disparate sources