K-12 MATHEMATICS SPECIALIST ENDORSEMENT

ED 601: Foundations and Issues of Mathematics Education (2 credits)
This course provides an introduction to K-12 mathematics content and process standards, makes the case for using an inquiry-oriented approach in classrooms, and looks at current research. Participants will gain an understanding of the components needed to create a learning environment that encourages and supports *all children* in building understandings, making connections, reasoning, and solving problems as described in *Principles and Standards for School Mathematics,* published by the National Council of Teachers of Mathematics.
(Fulfills SD Dept. of Education Standards 3b 3e 4a 4d [Administrative Rule of SD 24:15:06:39])

ED 611: Algebraic Reasoning for K-12 Educators (2 credits)
This course is designed for K-12 educators to deepen their understanding of algebraic concepts that build from kindergarten through high school. Consistent with the *Principles and Standards for School Mathematics*, published by the National Council of Teachers of Mathematics, the course emphasizes patterns and functions; representation and analysis of mathematical situations; using models and symbols to represent quantitative relationships; and analyzing change. Instruction revolves around rich mathematical tasks and includes explicit attention to questioning, conjectures, and justification. Participants reflect on the benefits and challenges of this kind of learning environment and consider implications for their own teaching.
(Fulfills SD Standards 3a 3b 3d 4c)

ED 621: Geometry & Measurement for K-12 Educators (2 credits)
This course is designed for K-12 educators to deepen their understanding of geometry and measurement concepts that build from kindergarten through high school. Consistent with the *Principles and Standards for School Mathematics*, published by the National Council of Teachers of Mathematics, this course emphasizes characteristics of two- and three-dimensional shapes; spatial relationships and reasoning; transformations and symmetry; units, systems, and processes of measurement; and applying techniques, tools and formulas to determine measurement. Instruction revolves around rich mathematical tasks and includes explicit attention to questioning, conjectures, and justification. Participants reflect on the benefits and challenges of this kind of learning environment and consider implications for their own teaching.
(Fulfills SD Standards 3a 3b 3d 4c)

ED 631: Data Analysis & Probability for K-12 Educators (2 credits)
This course is designed for K-12 educators to deepen their understanding of data analysis and probability concepts that build from kindergarten through high school. Consistent with the *Principles and Standards for School Mathematics*, published by the National Council of Teachers of Mathematics, this course emphasizes methods of collecting, organizing, and displaying data; using appropriate statistical methods to analyze data; evaluating inferences and predictions that are based on data; and understanding and applying basic concepts of probability. Instruction revolves around rich mathematical tasks and includes explicit attention to questioning, conjectures, and justification. Participants reflect on the benefits and challenges of this kind of learning environment and consider implications for their own teaching.
(Fulfills SD Standards 3a 3b 3d 4c)

ED 641: Understanding Student Thinking in Numbers and Operations (2 credits)
This course is designed to deepen teachers' awareness of ways that students come to understand whole numbers, rational numbers, and operations. Emphasis is placed on common student difficulties and on how teachers can help to move students from a procedural approach to conceptual understanding.
(Fulfills SD Standards 3a 3b 3d 4a 4b 4c 4d)

ED 651: Understanding Student Thinking in Algebra (2 credits)
Based on recent research in mathematics education, this course provides opportunities for educators to deepen their understanding of how K-12 students develop algebraic reasoning. The course focuses on conceptual and procedural understanding of the key algebraic ideas of equality, variables and equations, patterns and functions, proportional reasoning, symbolic representation, and inductive and deductive reasoning.
(Fulfills SD Standards 3a 3b 3d 4a 4b 4c 4d)

ED 661: Understanding Student Thinking in Geometry & Measurement (2 credits)
This course is designed to help teachers think through major ideas within the areas of K-12 geometry and measurement and to use recent research to examine how students develop their ideas. The course is also designed to raise awareness of common student misconceptions and to deepen teachers' knowledge of effective instructional practices.
(Fulfills SD Standards 3a 3b 3d 4a 4b 4c 4d)

ED 671: Assessment for School Mathematics (2 credits)
This course supports educators in assessing what K-12 students know, what they can do, how they think mathematically, and their attitudes toward mathematics. Current assessment practices, from informal questioning to standardized testing, are explored, and the use of assessment information to guide instruction is emphasized. The course also considers national data and examines connections between staff development, classroom practice, and student outcomes, thereby laying a foundation for discussions about the future direction of local, state, and national mathematics improvement efforts.
(Fulfills SD Standards 3e 4a 4b)

ED 741: Historical Development of Mathematical Concepts (2 credits)
This course traces the origins and development of key concepts in the history of mathematics starting with early Egyptians, Babylonians, and Mayans and continuing to current times. Emphasis is given to the impact of mathematical discoveries on the civilizations that gave rise to them and to the impact of these discoveries on subsequent mathematical thought.
(Fulfills SD Standard 3c)

ED 751: Leadership in School Mathematics (2 credits)
This course focuses on how to provide effective professional development for K-12 teachers of mathematics and how to support meaningful change within an educational system. Lessons are drawn from research in mathematics education as well as research about improving schools. Topics include creation of a demonstration classroom, engaging key stakeholders (e.g., parents, administrators, and community members), forming and facilitating study groups, peer coaching, mentoring, and curriculum review. (Fulfills SD Standard 4e)

Certificate in Mathematics Education: The following coursework (12 credits) constitutes a stand-alone graduate-level certificate in mathematics education.

ED 601	Foundations and Issues of Mathematics Education
ED 611	Algebraic Reasoning for K-12 Educators
ED 621	Geometry & Measurement for K-12 Educators
ED 631*	Data Analysis & Probability for K-12 Educators
ED 641	Understanding Student Thinking in Numbers and Operations
ED 651	Understanding Student Thinking in Algebra

* ED 661 Understanding Student Thinking in Geometry & Measurement may be substituted

This Certificate represents significant progress toward the K-12 Mathematics Specialist Endorsement. To qualify for the endorsement, 4 additional courses (ED 631*or ED 661*, ED 671, ED 741, ED 751) as well as "advanced certification" as recognized by the SD Department of Education (a master's degree or above or National Board Certification) and three years of experience teaching mathematics in a K-12 setting are also required.

MSCI with Specialization in Mathematics Education: 18 specialization credits plus 17 MSCI core class credits (listed below) comprise the master's degree. (35 credits total)

Core Courses for the MSCI
ED 630 Educational Inquiry and Collaboration (3 credits)

ED703 Applying Learning Theory to Instruction & Assessment (3 credits)

ED744 Curriculum Development & Instruction (3 credits)

ED750 Action Research in Schools (3 credits)

ED748 Cultural Diversity in Schools (3 credits)

ED790 Educational Research in Schools (2 credits)

***The requirements of ED 630 (3) will be met by taking ED 663 Graduate Writing (1) + ED 601 Foundations & Issues of Mathematics Education (2)*

Please Note: As specified in South Dakota Administrative Rule 24:15:06:39, in order for a graduate of an approved K-12 Mathematics Specialist program to receive a K-12 Mathematics Specialist Endorsement from the South Dakota Department of Education, Standards 1 and 2 below must be met. All other endorsement standards are met through the coursework described above.

Standard 1: Advanced certification (posses a master's degree or above and/or National Board Certification).
Standard 2: Three years of experience teaching mathematics in a K-12 setting.

For more information, please contact:
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