

Standing Requirements

## Outcomes Library

### BA/BS in Mathematics Teaching Outcome Set - Oct. 2014

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Outcome	Mapping
<b>Outcome 1: Content Knowledge</b> Effective teachers of secondary mathematics demonstrate and apply knowledge of major mathematics concepts, algorithms, procedures, connections, and applications within and among mathematical content domains.	No Mapping
<b>Outcome 2: Mathematical Practices</b> Effective teachers of secondary mathematics solve problems, represent mathematical ideas, reason, prove, use mathematical models, attend to precision, identify elements of structure, generalize, engage in mathematical communication, and make connections as essential mathematical practices. They understand that these practices intersect with mathematical content and that understanding relies on the ability to demonstrate these practices within and among mathematical domains and in their teaching.	No Mapping
<b>Outcome 3: Content Pedagogy</b> Effective teachers of secondary mathematics apply knowledge of curriculum standards for mathematics and their relationship to student learning within and across mathematical domains. They incorporate research-based mathematical experiences and include multiple instructional strategies and mathematics-specific technological tools in their teaching to develop all students' mathematical understanding and proficiency. They provide students with opportunities to do mathematics – talking about it and connecting it to both theoretical and real-world contexts. They plan, select, implement, interpret, and use formative and summative assessments for monitoring student learning, measuring student mathematical understanding, and informing practice.	No Mapping
<b>Outcome 4: Mathematical Learning Environment</b> Effective teachers of secondary mathematics exhibit knowledge of adolescent learning, development, and behavior. They use this knowledge to plan and create sequential learning opportunities grounded in mathematics education research where students are actively engaged in the mathematics they are learning and building from prior knowledge and skills. They demonstrate a positive disposition toward mathematical practices and learning, include culturally relevant perspectives in teaching, and demonstrate equitable and ethical treatment of and high expectations for all students. They use instructional tools such as manipulatives, digital tools, and virtual resources to enhance learning while recognizing the possible limitations of such tools.	No Mapping
<b>Outcome 5: Impact on Student Learning</b> Effective teachers of secondary mathematics provide evidence demonstrating that as a result of their instruction, secondary students' conceptual understanding, procedural fluency, strategic competence, adaptive reasoning, and application of major mathematics concepts in varied contexts have increased. These teachers support the continual development of a productive disposition toward mathematics. They show that new student mathematical knowledge has been created as a consequence of their ability to engage students in mathematical experiences that are developmentally appropriate, require active engagement, and include mathematics-specific technology in building new knowledge.	No Mapping

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**Outcome 6: Professional Knowledge and Skills** No Mapping

Effective teachers of secondary mathematics are lifelong learners and recognize that learning is often collaborative. They participate in professional development experiences specific to mathematics and mathematics education, draw upon mathematics education research to inform practice, continuously reflect on their practice, and utilize resources from professional mathematics organizations.

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**Outcome 7: Secondary Mathematics Field Experiences and Clinical Practice** No Mapping

Effective teachers of secondary mathematics engage in a planned sequence of field experiences and clinical practice under the supervision of experienced and highly qualified mathematics teachers. They develop a broad experiential base of knowledge, skills, effective approaches to mathematics teaching and learning, and professional behaviors across both middle and high school settings that involve a diverse range and varied groupings of students. Candidates experience a full-time student teaching/internship in secondary mathematics directed by university or college faculty with secondary mathematics teaching experience or equivalent knowledge base.

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**Outcome 8: Number and Quantity** No Mapping

To be prepared to develop student mathematical proficiency, all secondary mathematics teachers should know the topics related to number and quantity with their content understanding and mathematical practices supported by appropriate technology and varied representational tools, including concrete models.

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**Outcome 9: Algebra** No Mapping

To be prepared to develop student mathematical proficiency, all secondary mathematics teachers should know the topics related to algebra with their content understanding and mathematical practices supported by appropriate technology and varied representational tools, including concrete models:

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**Outcome 10: Geometry and Trigonometry** No Mapping

To be prepared to develop student mathematical proficiency, all secondary mathematics teachers should know the topics related to geometry and trigonometry with their content understanding and mathematical practices supported by appropriate technology and varied representational tools, including concrete models.

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**Outcome 11: Statistics and Probability** No Mapping

To be prepared to develop student mathematical proficiency, all secondary mathematics teachers should know the topics related to statistics and probability with their content understanding and mathematical practices supported by appropriate technology and varied representational tools, including concrete models.

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**Outcome 12: Calculus** No Mapping

To be prepared to develop student mathematical proficiency, all secondary mathematics teachers should know the topics related to calculus with their content understanding and mathematical practices supported by appropriate technology and varied representational tools, including concrete models.

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**Outcome 13: Discrete Mathematics** No Mapping

To be prepared to develop student mathematical proficiency, all secondary mathematics teachers should know the topics related to discrete mathematics with their content understanding and mathematical practices supported by appropriate technology and varied representational tools, including concrete models.

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## BA/BS in Mathematics Teaching Outcome Set - Old

### Mathematics Preparation for All Mathematics Teacher Candidates

Outcome	Mapping
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1. Knowledge of Problem Solving Candidates know, understand and apply the process of mathematical problem solving.	No Mapping
2. Knowledge of Reasoning and Proof Candidates reason, construct, and evaluate mathematical arguments and develop an appreciation for mathematical rigor and inquiry.	No Mapping
3. Knowledge of Mathematical Communication Candidates communicate their mathematical thinking orally and in writing to peers, faculty and others.	<b>Foundational Studies:</b> 10. Express themselves effectively, professionally, and persuasively both orally and in writing.
4. Knowledge of Mathematical Connections Candidates recognize, use, and make connections between and among mathematical ideas and in contexts outside mathematics to build mathematical understanding.	No Mapping
5. Knowledge of Mathematical Representation Candidates use varied representations of mathematical ideas to support and deepen students' mathematical understanding.	No Mapping
6. Knowledge of Technology Candidates embrace technology as an essential tool for teaching and learning mathematics.	No Mapping
7. Dispositions Candidates support a positive disposition toward mathematical processes and mathematical learning.	No Mapping
8. Knowledge of Mathematics Pedagogy Candidates possess a deep understanding of how students learn mathematics and of the pedagogical knowledge specific to mathematics teaching and learning.	No Mapping
9. Knowledge of Number and Operations Candidates demonstrate computational proficiency, including a conceptual understanding of numbers, ways of representing number, relationships among number and number systems, and the meaning of operations.	No Mapping
10. Knowledge of Different Perspectives on Algebra Candidates emphasize relationships among quantities including functions, ways of representing mathematical relationships, and the analysis of change.	No Mapping
11. Knowledge of Geometries Candidates use spatial visualization and geometric modeling to explore and analyze geometric shapes, structures, and their properties.	No Mapping
12. Knowledge of Calculus Candidates demonstrate a conceptual understanding of limit, continuity, differentiation, and integration and a thorough background in techniques and application of the calculus.	No Mapping
13. Knowledge of Discrete Mathematics Candidates apply the fundamental ideas of discrete mathematics in the formulation and solution of problems.	No Mapping
14. Knowledge of Data Analysis, Statistics and Probability Candidates demonstrate an understanding of concepts and practices related to data analysis, statistics, and probability.	No Mapping
15. Knowledge of Measurement Candidates apply and use measurement concepts and tools.	No Mapping
16.3 Field-Based Experience Demonstrate the ability to increase students' knowledge of mathematics.	No Mapping

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