

MATHEMATICS ENDORSEMENT

The goals of mathematics education are to enable the student to demonstrate an understanding of mathematics processes, perspectives, and ideas in the content areas including number systems, geometry and measurement, statistics and probability, functions and algebra, and discrete mathematics. Becoming a teacher is a lifelong undertaking that is initiated in college course work, refined in field experiences, and enhanced during professional practice. The course work and related field and laboratory experiences will provide the prospective teacher the knowledge and skills to accomplish the following:

I. Mathematical Processes and Perspectives

- _____ A. Use problem solving approaches to help students investigate and understand mathematics _____
- _____ B. Use a variety of manipulatives and visual materials to facilitate students' exploration and development of mathematical concepts. _____
- _____ C. Use graphing calculators, computers and other technologies as tools for teaching mathematics. _____
- _____ D. Communicate mathematics ideas orally and in writing, using everyday and mathematical language, including symbols. _____
- _____ E. Use teacher-to-teacher, teacher-to-student, and student-to-student discourse to extend mathematical understanding. _____
- _____ F. Create an effective learning environment employing multiple teaching strategies in which students feel free to take risks. _____
- _____ G. Make and evaluate mathematical conjectures and arguments to validate mathematical thinking _____
- _____ H. Use a variety of methods aligned with instructional techniques to assess mathematical thinking. _____
- _____ I. Show an understanding of interrelationships within mathematics; connect mathematics to other disciplines and real-world situations so that students will appreciate the significant role that mathematics plays in their lives. _____
- _____ J. Know the historical development, notations, and terminology of algebras, geometries, and the calculus. _____
- _____ K. Understand the diverse cultural heritage and dynamic nature of mathematics including recent developments. _____

II. Number Sense, Systems and Theory

- _____ A. Demonstrate number sense, including a sense of magnitude, mental mathematics, estimation place value, and a sense of the reasonableness of results. _____
- _____ B. Represent and use numbers in a variety of equivalent forms, including integers, fractions, decimals, percent, and exponential and scientific notation. _____
- _____ C. Know computational procedures, including common and uncommon algorithms, mental strategies, use of manipulatives and other representations, technology, and paper and pencil. _____
- _____ D. Know algebraic properties of number systems. _____
- _____ E. Understand number theory at appropriate levels from abstract and concrete perspectives. _____
- _____ F. Apply the above to real world models and applications _____

III. Geometry and Measurement

- _____ A. Understand shapes and use spatial reasoning. _____
- _____ B. Use geometric models to represent, visualize and solve problems. _____
- _____ C. Estimate and use direct and indirect measurements and formulas to describe and compare geometric phenomena. _____
- _____ D. Understand systems of geometry, including Euclidean, non-Euclidean, coordinate, transformational, and projective geometry, from both the synthetic and analytical points of view. _____
- _____ E. Reason on an abstract level, make and test conjectures, and explore theorems. _____

IV. Statistics and Probability

- _____ A. Collect, represent, analyze and interpret data. _____
- _____ B. Use data to formulate and test hypotheses, draw conclusions, and make convincing arguments _____
- _____ C. Use descriptive and inferential statistics to model real world situations and to understand the role played by statistics and probability in social, political and economic processes. _____
- _____ D. Determine experimental probabilities by devising and carrying out experiments or simulations. _____
- _____ E. Determine theoretical probability by constructing a sample space. _____
- _____ F. Use probability as a way to describe chance or risk in simple and compound events. _____

V. Functions, Algebra and Concepts of Calculus

- _____ A. Describe, extend, analyze and create a wide variety of patterns to develop the concept of a function and its role in algebra. _____
- _____ B. Model and solve problems using algebraic methods employing manipulatives and technology as appropriate. _____
- _____ C. Understand the concepts of limit, continuity, differentiation and integration and how they relate to the calculus. _____
- _____ D. Apply the concepts and techniques of calculus to the analysis of functions and graphs of functions. _____
- _____ E. Apply the basic theory of linear algebra, calculus of vectors, and linear transformations. _____

VI. Discrete Mathematics

- _____ A. Apply counting techniques to collect and organize information and solve problems. _____
- _____ B. Understand symbolic . _____
- _____ C. Model real world problems using graph theory, linear programming and matrices. _____
- _____ D. Develop and analyze algorithms including iterative and recursive techniques. _____

COMMENTS: _____

DEFICIENCIES: _____

ADVISER APPROVAL:

_____ Date

This audit should accompany FORM A (blue undergraduate liberal arts audit) and FORM B (yellow graduate-level audit). After the adviser has approved all three audit forms, they should be sent to the Director of Teacher Licensure, 305 Wyatt Center, for final processing. Approved audits will be copied and sent to the adviser and the student.

GUIDELINES FOR MATHEMATICS ENDORSEMENT

- I. Each Peabody teacher education student is required to file a program of studies (undergraduate) or audit form (graduate) to itemize the required courses and field work to acquire knowledge and skills specified for the mathematics 7-12 endorsement. Prior to licensure recommendation, each program of studies and audit form is analyzed to verify completion.
- II. Both undergraduate and graduate programs require study in human development and instructional knowledge and skills applicable to both middle and high school levels.
- III. Teacher candidates for the mathematics 7-12 endorsement experience teaching in both middle and high school classrooms.
- IV. Candidates for the mathematics 7-12 endorsement are experienced with graphing calculators, computers and other technologies, manipulatives, and visual materials as tools for teaching mathematics.