

## **EDMA 608 Mathematical Problem Solving: An Overview for Educators**

Student Outcomes. The student will be able to:

1. Demonstrate that they are effective problem solvers as evidenced by their perseverance, their ability to select appropriate strategies to solve problems, and their ability to justify and defend their solutions
2. Demonstrate that they are effective problem posers who will be able to challenge their students to become effective problem posers as evidenced by their ability to construct, analyze, and support tasks and criteria for mathematical problems
3. Review, synthesize, and evaluate research on mathematical problem solving and the best practices for teaching problem solving
4. Identify, compare and contrast, and evaluate instructional plans based on a problem-solving curricular approach for a diverse student population
5. Identify, compare and contrast, and evaluate assessment tools based on a problem-solving curricular approach for a diverse student population
6. Demonstrate an ability to engage K-8 students in the five process standards: problem solving, reasoning, communication, connections and representations

## **EDMA 614 Numeration and Operations: Math Content and Pedagogy for Educators**

Student Outcomes. The student will be able to:

1. Construct knowledge of the development, use, and multiple representation of numbers and number systems
2. Investigate role of numbers as a logical predictable system for expressing and relating quantities
3. Identify and critique the elements of elementary number systems
4. Develop and support number sense and knowledge of number systems
5. Model the use of the four basic operations in multiple contexts
6. Decompose numbers in different ways, internalize their understanding and demonstrate it in applied problem solving
7. Apply and justify computation and estimation abilities appropriately in real life situations for a diverse student population
8. Model, explain, develop and critique a variety of computational algorithms
9. Explore and demonstrate knowledge of the operations, properties, and uses of whole numbers, fractions, and decimals
10. Analyze and compare features and basic computational techniques in selected numeration systems in use today and in the past
11. Use a variety of mental computation techniques and assess the appropriateness of each
12. Use estimation and mental math, paper-pencil algorithms, manipulative materials, calculators, and computers, in solving a wide variety of problems and appraise choices for a diverse student population
13. Apply estimation strategies to quantities, measurements and computation to determine the reasonableness of results
14. Demonstrate fluency in basic estimation and calculator skills for a diverse student population
15. Analyze and correctly use scientific notation in real life problems
16. Explore and practice activities with physical models such as: multibase blocks, fraction bars, colored chips, geoboards and number lines
17. Explore and effectively use a variety of instructional and assessment techniques, both traditional and performance based (as evidenced by instructional and assessment designs for all K-8 students)
18. Incorporate process standards (communication, reasoning, problem solving, connections and representation) in all lesson and assessment designs (as evidenced by instructional and assessment designs for all K-8 students)

## **EDMA 654 Algebra and Functions: Content and Pedagogy for Educators**

Student Outcomes. The student will be able to:

1. Demonstrate that they understand the underlying concepts of algebra as evidenced by their perseverance, their ability to select appropriate strategies to solve problems, and their ability to justify and defend their solutions
2. Demonstrate they are able to convert problem situations so algebraic concepts can be employed to find solutions
3. Demonstrate they are able to challenge students to construct, analyze, and support tasks and criteria for solving problems using algebra
4. Review, synthesize, and evaluate research on algebra and functions in the K-8 mathematics curriculum, and the best practices for teaching algebra and functions
5. Be able to integrate algebraic concepts into the K-8 mathematics curriculum with accommodations for special needs students

## **EDMA 655 Geometry and Measurement: Content and Pedagogy for Educators**

- A. Student Outcomes. The student will be able to:
1. Demonstrate that they understand the underlying concepts of geometry and measurement as evidenced by their perseverance, their ability to select appropriate strategies to solve problems, and their ability to justify and defend their solutions
  2. Demonstrate they are able to convert problem situations so geometry and measurement can be employed to find solutions
  3. Demonstrate they are able to challenge students to construct, analyze, and support tasks and criteria for solving problems using geometry and measurement
  4. Review, synthesize, and evaluate research on geometry and measurement in the K-8 mathematics curriculum, and the best practices for teaching algebra and functions
  5. Be able to integrate geometry and measurement into the K-8 mathematics curriculum with accommodations for special needs students

## **EDMA 656 Data Analysis, Statistics, and Probability: Content and Pedagogy for Educators**

- A. Student Outcomes. The student will be able to:
1. Demonstrate that they understand the underlying concepts of data analysis, statistics, and probability as evidenced by their perseverance, their ability to select appropriate strategies to solve problems, and their ability to justify and defend their solutions
  2. Demonstrate they are able to convert problem situations so data analysis, statistics, and probability can be employed to find solutions
  3. Demonstrate they are able to challenge students to construct, analyze, and support tasks and criteria for solving problems using data analysis, statistics, and probability
  4. Review, synthesize, and evaluate research on data analysis, statistics, and probability in the K-8 mathematics curriculum, and the best practices for teaching algebra and functions
  5. Be able to integrate data analysis, statistics, and probability into the K-8 mathematics curriculum with accommodations for special needs students

## **EDMA 657 Concepts of Calculus and Trigonometry: Content and Pedagogy for Educators**

Student Outcomes. The student will be able to:

1. Demonstrate that they understand the underlying concepts of calculus and trigonometry as evidenced by their perseverance, their ability to select appropriate strategies to solve problems, and their ability to justify and defend their solutions
2. Demonstrate they are able to convert problem situations so concepts of calculus and trigonometry can be employed to find solutions
3. Demonstrate they are able to challenge students to construct, analyze, and support tasks and criteria for solving problems using concepts of calculus and trigonometry
4. Review, synthesize, and evaluate research on concepts of calculus and trigonometry in the K-8 mathematics curriculum, and the best practices for teaching algebra and functions
5. Be able to integrate concepts of calculus and trigonometry into the K-8 mathematics curriculum with accommodations for special needs students

## **EDMA 658 Technology for Teaching and Learning Mathematics**

Student Outcomes. The student will be able to:

1. Demonstrate that they can make effective use of technology in various forms as evidenced by their perseverance, their ability to select appropriate technology to solve problems, and their ability to justify and defend their selection
2. Demonstrate that they can effectively use technology to help their students understand mathematics as evidenced by their students' ability to solve mathematical problems
3. Review, synthesize, and evaluate research on using technology to teach mathematics
4. Be able to utilize technology to address the NCTM Standards, with accommodations addressed for special needs students.
5. Identify, describe, explain, compare, design, appraise and evaluate a multiple set of instructional plans based on using technology to address curricular needs for a diverse student population
6. Demonstrate an ability to support their students by using the plans and assessments described above and which also engage them in the five process standards: problem solving, reasoning, communication, connections and representations