NATIONAL RECOGNITION REPORT
Initial Preparation of Mathematics Education Teachers at the Secondary Level (2003 Standards)

NCATE recognition of this program is dependent on the review of the program by representatives of the National Council of Teachers of Mathematics (NCTM).

COVER PAGE

Name of institution

University of Arkansas—Fort Smith College of Education

Date of review

MM DD YYYY

08 / 01 / 2014

This report is in response to a(n):

- (●) Initial Review
- ( ) Revised Report
- ( ) Response to Conditions Report

Program Covered by this Review

Mathematics Teacher with Licensure

Grade Level(1)

7-12

(1) e.g. Early Childhood; Elementary K-6

Program Type

First Teaching License

Award or Degree Level

- (●) Baccalaureate
- ( ) Post Baccalaureate
- ( ) Master's

PART A - RECOGNITION DECISION

SPA Decision on NCATE Recognition of the Program(s):

- (●) Nationally recognized
- ( ) Nationally recognized with conditions

- ○ Further development required **OR** Nationally recognized with probation **OR** Not nationally recognized [See Part G]

Test Results (from information supplied in Assessment #1, if applicable)
The program meets or exceeds an 80% pass rate on state licensure exams:

- ◉ Yes
- ○ No
- ○ Not applicable
- ○ Not able to determine

Comments, if necessary, concerning Test Results:

Scores for 6 program completers document a pass rate exceeding 80%.

Summary of Strengths:

There are many strengths found in this program. Students are provided the opportunity to study theoretical and applied mathematics. There is appropriate use of technology throughout the program. Mathematics content and pedagogy linking coursework in the area of numerical systems spatial relations and upper secondary provide excellent opportunities to help candidates think deeply about the mathematics they will teach. The assessments used as evidence provide multiple opportunities for candidates to demonstrate how they meet these standards.

PART B - STATUS OF MEETING SPA STANDARDS

Standard 1. Knowledge of Problem Solving. Candidates know, understand and apply the process of mathematical problem solving.

Indicators:

1.1 Apply and adapt a variety of appropriate strategies to solve problems.

Met	Not Met
◉	○

1.2 Solve problems that arise in mathematics and those involving mathematics in other contexts

Met	Not Met
◉	○

1.3 Build new mathematical knowledge through problem solving.

Met	Not Met
◉	○

1.4 Monitor and reflect on the process of mathematical problem solving.

Met	Not Met
◉	○

Standard 1 comments:

Section III of the program report indicates Assessments 1, 2, and 7 address this standard.

Indicators 1.1, 1.2 and 1.4 are met with Assessment 1 (Praxis II 0061, 0063, and 0065).
Indicators 1.1-1.4 are met with Assessment 2.
Indicators 1.1, 1.2, and 1.3 are met with Assessment 7.

Standard 2. Knowledge of Reasoning and Proof. Candidates reason, construct, and evaluate mathematical arguments and develop an appreciation for mathematical rigor and inquiry.

Indicators:

2.1 Recognize reasoning and proof as fundamentals aspects of mathematics.

Met (●) Not Met ( )

2.2 Make and investigate mathematical conjectures

Met (●) Not Met ( )

2.3 Develop and evaluate mathematical arguments and proofs.

Met (●) Not Met ( )

2.4 Select and use various types of reasoning and methods of proof.

Met (●) Not Met ( )

Standard 2 comments:

Section III of the program report indicates Assessments 1, 2, 3, and 7 address this standard.

Indicators 2.1, 2.3, and 2.4 are met with Assessment 1 (Praxis II 0063).
Indicators 2.1-2.4 are met with Assessments 2 and 7.

Standard 3. Knowledge of Mathematical Communication. Candidates communicate their mathematical thinking orally and in writing to peers, faculty and others.

Indicators:

3.1 Communicate their mathematical thinking coherently and clearly to peers, faculty, and others.

Met (●) Not Met ( )

3.2 Use the language of mathematics to express ideas precisely.

Met (●) Not Met ( )

Met | Not Met

3.4 Analyze and evaluate the mathematical thinking and strategies of others.

Met | Not Met

Standard 3 comments:

Section III of the program report indicates Assessments 1, 2, 3, 4, and 7 address this standard.

Indicators 3.1.- 3.4 are met with Assessment 1 (Praxis II 0063 and 0065).
Indicators 3.1-3.4 are met with Assessment 2 and Assessment 7.
Assessments 3 and 4 show how this standard is implemented in the classroom and provide support for indicator 3.4.

Standard 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.

Indicators:
4.1 Recognize and use connections among mathematical ideas.

Met | Not Met

4.2 Recognize and apply mathematics in contexts outside of mathematics.

Met | Not Met

4.3 Demonstrate how mathematical ideas interconnect and build on one another to produce a coherent whole.

Met | Not Met

Standard 4 comments:

Section III of the program report indicates Assessments 1, 2, 3, 4, and 7 address this standard.

Indicators 4.1-4.3 are met with Assessments 1, 2, and 7.

Assessment 3 (Planning a Mathematics Unit) and Assessment 4 (Mathematics Internship Portfolio) show how this standard is implemented in the classroom.

Standard 5. Knowledge of Mathematical Representation. Candidates use varied representations of mathematical ideas to support and deepen students' mathematical understanding.

Indicators:

5.1 Use representations to model and interpret physical, social, and mathematical phenomena.

Met | Not Met

5.2 Create and use representations to organize, record, and communicate mathematical ideas

Met | Not Met

5.3 Select, apply, and translate among mathematical representations to solve problems

Met | Not Met

Standard 5 comments:

Section III of the program report indicates Assessments 1, 2, and 7 address this standard.

Indicators 5.1-5.3 are met with Assessments 1, 2, and 7.

Standard 6. Knowledge of Technology. Candidates embrace technology as an essential tool for teaching and learning mathematics.

Indicators:

6.1 Use knowledge of mathematics to select and use appropriate technological tools, such as but not limited to, spreadsheets, dynamic graphing tools, computer algebra systems, dynamic statistical packages, graphing calculators, data-collection devices, and presentation software.

Met | Not Met

Standard 6 comments:

Section III of the program report indicates Assessment 2, 4, and 7 address this standard.

Indicator 6.1 is met with Assessments 2 and 7.

Standard 7. Dispositions. Candidates support a positive disposition toward mathematical processes and mathematical learning.

Indicators:

7.1 Attention to equity

Met | Not Met

7.2 Use of stimulating curricula

Met | Not Met

Met | Not Met

7.4 Commitment to learning with understanding

Met | Not Met

7.5 Use of various assessments

Met | Not Met

7.6 Use of various teaching tools including technology

Met | Not Met

Standard 7 comments:

Section III of the program report indicates Assessments 1, 2, 3, 4, 5, and 6 address this standard.

Assessment 1 does not provide evidence for any indicators in Standard 7.
Assessments 3, 4, and 5 provide evidence for indicators 7.1-7.6.
Indicator 7.1 is met with Assessment 6.

Standard 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.

Indicators:

8.1 Select, use, and determine suitability of the wide variety of available mathematics curricula and teaching materials for all students, including those with special needs such as the gifted, challenged and speakers of other languages.

Met | Not Met

8.2 Select and use appropriate concrete materials for learning mathematics.

Met | Not Met

8.3 Use multiple strategies, including listening to and understanding the ways students think about mathematics, to assess students' mathematical knowledge.

Met | Not Met

8.4 Plan lessons, units and courses that address appropriate learning goals, including those that address local, state, and national mathematics standards and legislative mandates.

Met | Not Met

resources.

Met	Not Met
◉	○

8.6 Demonstrate knowledge of research results in the teaching and learning of mathematics

Met	Not Met
○	◉

8.7 Use knowledge of different types of instructional strategies in planning mathematics lessons.

Met	Not Met
◉	○

8.8 Demonstrate the ability to lead classes in mathematical problem solving and in developing in-depth conceptual understanding, and help students develop and test generalizations

Met	Not Met
◉	○

8.9 Develop lessons that use technology's potential for building understanding of mathematical concepts and developing important mathematical ideas.

Met	Not Met
◉	○

Standard 8 comments:

Section III of the program report indicates Assessments 1, 2, 3, 4, 5, and 7 address this standard.

Indicators 8.3 and 8.9 are met with Assessment 1 (Praxis II 0065).
Indicators 8.1-8.5 and 8.7-8.9 are met with Assessments 3, 4, and 5.
Indicator 8.9 is met with Assessments 2 and 4.

Indicator 8.6 is NOT MET.

Standard 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 meanings of operations.

Indicators:

9.1 Analyze and explain the mathematics that underlies the procedures used for operations invloving integers, rational, real and complex numbers.

Met	Not Met
◉	○

9.2 Use properties involving number and operations, mental computation, and computational estimation.

Met	Not Met
◉	○

9.3 Provide equivalent representations of fractions, decimals, and percents.

Met (●) Not Met ( )

9.4 Create, solve, and apply proportions.

Met (●) Not Met ( )

9.5 Apply the fundamental ideas of number theory.

Met (●) Not Met ( )

9.6 Makes sense of large and small numbers and number systems.

Met (●) Not Met ( )

9.7 Compare and contrast properties of numbers and number systems.

Met (●) Not Met ( )

9.8 Represent, use and apply complex numbers.

Met (●) Not Met ( )

9.9 Recognize matrices and vectors as systems that have some of the properties of the real number system.

Met (●) Not Met ( )

9.10 Demonstrate knowledge of the historical development of numbers and number systems including contributions from diverse cultures.

Met (●) Not Met ( )

Standard 9 comments:

Section III of the program report indicates Assessments 1 and 2 address this standard.

Indicators 9.1-9.9 are met with Assessment 1 (Praxis 0061).
Indicators 9.1-9.10 are met with Assessment 2.

Standard 10. Knowledge of Different Perspectives on Algebra. Candidates emphasize relationships among quantities including functions, ways of representing mathematical relationships, and the analysis of change.

Indicators:

10.1 Analyze patterns, relations, and functions of one and two variables.

Met | Not Met

10.2 Apply fundamental ideas of linear algebra.

Met | Not Met

10.3 Apply the major concepts of abstract algebra to justify algebraic operations and formally analyze algebraic structures.

Met | Not Met

10.4 Use mathematical models to represent and understand quantitative relationships.

Met | Not Met

10.5 Use technological tools to explore algebraic ideas and representations of information and in solving problems.

Met | Not Met

10.6 Demonstrate knowledge of the historical development of algebra including contributions from diverse cultures.

Met | Not Met

Standard 10 comments:

Section III of the program report indicates Assessments 1 and 2 address this standard.

Indicators 10.1, 10.2 and 10.4 are met with Assessment 1 (Praxis 0061).
Indicators 10.1-10.6 are met with Assessment 2.

Standard 11. Knowledge of Geometries. Candidates use spatial visualization and geometric modeling to explore and analyze geometric shapes, structures, and their properties.

Indicators:

11.1 Demonstrate knowledge of core concepts and principles of Euclidean and non-Euclidean geometry in two- and three-dimensions from both formal and informal perspectives.

Met | Not Met

11.2 Exhibit knowledge of the role of axiomatic systems and proof in geometry.

Met | Not Met

Met | Not Met

11.4 Build and manipulate representations of two- and three-dimensional objects and visual objects from different perspectives.

Met | Not Met

11.5 Specify locations and describe spatial relationships using coordinate geometry, vectors and other representational systems.

Met | Not Met

11.6 Apply transformation and use symmetry, similarity, and congruence to analyze mathematical situations.

Met | Not Met

11.7 Use concrete models, drawings, and dynamic geometric software to explore geometric ideas and their applications in real-world contexts.

Met | Not Met

11.8 Demonstrate knowledge of the historical development of Euclidean and non-Euclidean geometries including contributions from diverse cultures.

Met | Not Met

Standard 11 comments:

Section III of the program report indicates Assessments 1 and 2 address this standard.

Indicators 11.3, 11.5, and 11.6 are met with Assessment 1 (Praxis 0061).
Indicators 11.1-11.8 are met with Assessment 2.

Standard 12. Knowledge of Calculus. Candidates demonstrate a conceptual understanding of limit, continuity, differentiation, and integration and a thorough background in techniques and application of calculus.

Indicators:

12.1 Demonstrate a conceptual understanding of and procedural facility with basic calculus concepts.

Met | Not Met

12.2 Apply concepts of function, geometry, and trionometry in solving problems involving calculus.

Met | Not Met

12.3 Use the concepts of calculus and mathematical modleing to represent and solve problems taken from real-world context.

Met | Not Met

12.4 Use technological tools to explore and represent fundamental concepts of calculus.

Met | Not Met

12.5 Demonstrate knowledge of the historical development of calculus including contributions from diverse cultures.

Met | Not Met

Standard 12 comments:

Section III of the program report indicates Assessments 1 and 2 address this standard.

Indicators 12.1-12.3 are met with Assessment 1 (Praxis 0061).
Indicators 12.1-12.5 are met with Assessment 2.

Standard 13. Knowledge of Discrete Mathematics. Candidates apply the fundamental ideas of discrete mathematics in the formulation and solution of problems.

Indicators:

13.1 Demonstrate knowledge of basic elements of discrete mathematics such as graph theory, recurrence relations, finite difference approaches, linear programming, and combinatorics.

Met | Not Met

13.2 Apply the fundamental ideas of discrete mathematics in the formulation and solution of problems arising from real-world situations.

Met | Not Met

13.3 Use technological tools to solve problems involving the use of discrete structures and application of algorithms.

Met | Not Met

13.4 Demonstrate knowledge of the historical develpment of discrete mathematics including contributions from diverse cultures.

Met | Not Met

Section III of the program report indicates Assessments 1 and 2 address this standard.

Indicators 13.1 and 13.2 are met with Assessment 1 (Praxis 0061).
Indicators 13.1, 13.3, and 13.4 are met with Assessment 2.

Standard 14. Knowledge of Data Analysis, Statistics, and Probability. Candidates demonstrate an understanding of concepts and practices related to data analysis, statistics, and probability.

Indicators:

14.1 Design investigations, collect data, and use a variety of ways to display the data and interpret data representations that may include bivariate data, conditional probability and geometric probability.

Met	Not Met
◉	○

14.2 Use appropriate methods such as random sampling or random assignment of treatments to estimate population characteristics, test conjectured relationships among variables, and analyze data.

Met	Not Met
◉	○

14.3 Use appropriate statistical methods and technological tools to describe shape and analyze spread and center.

Met	Not Met
◉	○

14.4 Use statistical inference to draw conclusions from data.

Met	Not Met
◉	○

14.5 Identify misuses of statistics and invalid conclusions from probability

Met	Not Met
○	◉

14.6 Draw conclusions involving uncertainty by using hands-on and computer-based simulation for estimating probabilities and gathering data to make inferences and conclusions.

Met	Not Met
○	◉

14.7 Determine and interpret confidence intervals.

Met	Not Met
◉	○

14.8 Demonstrates knowledge of the historical development of probability and statistics including contributions from diverse cultures.

Met	Not Met

Standard 14 comments:

Section III of the program report indicates Assessments 1 and 2 address this standard.

Indicator 14.1 is met with Assessment 1 (Praxis 0061).
Indicators 14.1-14.4 and 14.7-14.8 are met with Assessment 2. Partial evidence (no hands-on simulations) is found to support indicator 14.6.

Indicators 14.5 and 14.6 are NOT MET.

Standard 15. Knowledge of Measurement. Candidates apply and use measurement tools.

Indicators:

15.1 Recognize the common representations and uses of measurement and choose tools and units for measuring.

Met | Not Met

15.2 Apply appropriate techniques, tools, and formulas to determine measurements and their application in a variety of contexts.

Met | Not Met

15.3 Complete error analysis through determining the reliability of the numbers obtained from measures.

Met | Not Met

15.4 Demonstrate knowledge of the historical development of measurement and measurement systems including contributions from diverse cultures.

Met | Not Met

Standard 15 comments:

Section III of the program report indicates Assessments 1 and 2 address this standard.

Indicators 15.1-15.3 are met with Assessment 1 (Praxis 0061).
Indicators 15.1-15.4 are met with Assessment 2.

Standard 16. Field-Based Experiences. Candidates complete field-based experiences in mathematics classrooms.

Indicators:

16.1 Engage in a sequence of planned opportunities prior to student teaching that includes

observing and participating in both middle and secondary mathematics classrooms under the supervision of experienced and highly qualified teachers.

Met	Not Met
◉	○

16.2 Experience full-time student teaching in secondary mathematics that is supervised by a highly qualified teacher and a university or college supervisor with secondary mathematics teaching experience.

Met	Not Met
◉	○

16.3 Demonstrate the ability to increase students' knowledge of mathematics.

Met	Not Met
◉	○

Standard 16 comments:

Section III of the program report indicates that information provided in Section I (Context) addresses indicators 16.1 and 16.2. The Fieldwork description in Section I indicates that candidates are placed with experienced and highly qualified mentor teachers in both middle and high school settings during their pre–student teaching coursework.

Candidates student teach 34 hours/week under the supervision of a highly qualified teacher and a college supervisor with secondary mathematics teaching experience.

Section III of the program report indicates that Assessments 3, 4, and 5 address indicator 16.3. Indicator 16.3 is met with Assessments 3, 4, and 5.

PART C - EVALUATION OF PROGRAM REPORT EVIDENCE

C.1. Candidates' knowledge of content

Evidence that that candidates' knowledge of content is strong and appropriate can be found in both the required state examinations and the summary of course grades (Assessments 1 and 2). Assessment 7 (Senior Project) shows that candidates can engage in solving a mathematical problem with content knowledge that is new to that candidate. Appropriate use of technology is encouraged throughout the program. Candidates are encouraged to present their work to outside audiences.

C.2. Candidates' ability to understand and apply pedagogical and professional content knowledge, skills, and dispositions

Field experiences and student teaching provide opportunities for candidates to show that they understand and can apply pedagogical and professional content knowledge. Assessment 4 (Mathematics Internship Portfolio) gives candidates an opportunity to review their work and reflect on their experiences as they think about the students they teach and how they plan, teach, and assess their students.

C.3. Candidate effects on P-12 student learning

Opportunities to think about formative and summative assessment are evident throughout the program. Coursework such as MATH 3803 introduced formative and summative assessment as it relates to understanding number systems. Strong evidence of candidate effects on P-12 student learning can be found in Assessment 5 (Assessment of Student Mathematics Learning).

Evidence that assessment results are evaluated and applied to the improvement of candidate performance and strengthening of the program (as discussed in Section V of the program report)

When programs have strong evidence that they meet NCTM Standards, it can be difficult to find ways to improve candidates' performance. This program has identified ways to strengthen students content knowledge through new coursework and the addition of the ETS Major Field Test in Mathematics as a capstone assessment. In addition, they are revising rubrics to align with new P-12 standards and revising ways candidates can show how they influence student learning.
The suggested use of performance tasks and related rubrics will help strengthen candidates' ability to affect student learning.

PART E - AREAS FOR CONSIDERATION

Areas for consideration

It is important for candidates to not only use professional resources such as the Mathematics Teacher but also formally document that they use research and appropriate citation style as part of their work. Encouraging candidates to draw on the research and the work of others as well as to credit others when their work is used would enhance candidates' strong mathematics foundation.

PART F - ADDITIONAL COMMENTS

F.1. Comments on Section I (Context) and other topics not covered in Parts B-E:

The report is well organized and complete.

F.2. Concerns for possible follow-up by the Board of Examiners:

PART G - DECISIONS

Please select final decision:

- **National Recognition**. The program is recognized through the semester and year of the institution's next NCATE accreditation decision in 5-7 years. **To retain recognition, another program report must be submitted mid-cycle (2 years in advance for a 5-year cycle and 3 years in advance for a 7-year cycle) before the next scheduled accreditation visit.** The program will be listed as nationally recognized through the semester of the next NCATE accreditation decision on websites and/or other publications of the SPA and NCATE. The institution may designate its program as nationally recognized by NCATE, through the semester of the next NCATE accreditation decision, in its published materials. National recognition is dependent upon NCATE accreditation. *Please note that once a program has been nationally recognized, it may not submit another report addressing any unmet standards or other concerns cited in the recognition report.*

Please click "Next"

This is the end of the report. Please click "Next" to proceed.