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
Augustana College, IL

Date of review
02/01/2013

This report is in response to a(n):
- Initial Review
- Revised Report
- Response to Conditions Report

Program Covered by this Review
Mathematics Education

Grade Level(1)
6-12

(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:
This condition was met in the initial review. No data are presented in this response to conditions.

Summary of Strengths:
The Unit's program has an extensive series of assessments to ensure the quality of their program and preparedness of their candidates. The program appears to have strong, committed faculty who are active in their fields and engaged in the process of preparing teachers in the program.

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
Yes

1.2 Solve problems that arise in mathematics and those involving mathematics in other contexts.
Met Not Met
Yes

1.3 Build new mathematical knowledge through problem solving.
Met Not Met
Yes

1.4 Monitor and reflect on the process of mathematical problem solving.
Met Not Met
Yes

Standard 1 comments:
Indicators 1.1, 1.2, and 1.4 met in 2/1/2011 review. Assessment 3 meets indicator 1.3 through EDUC 384 grades. Assessment 4 directly assesses all components of Standard 1 and there are data from the revised instruments. Alignment between the assessment descriptors and specific NCTM indicators should be clearly shown. For Assessment 5, alignment between the assessment and the indicators addressed must be clearly shown in each assessment’s description and within scoring guides or rubrics.


Indicators:

2.1 Recognize reasoning and proof as fundamentals aspects of mathematics.

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2.2 Make and investigate mathematical conjectures

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2.3 Develop and evaluate mathematical arguments and proofs.

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

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Standard 2 comments:

Standard 2 indicators were met in the 2/1/2011 report. For Assessment 5, alignment between the assessment and the indicators addressed must be clearly shown in each assessment’s description and within scoring guides or rubrics for this standard. Revised Assessment 4 presents data and addresses each indicator. Alignment between the assessment descriptors and specific NCTM indicators should be clearly shown.

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.

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3.2 Use the language of mathematics to express ideas precisely.
Met Not Met
jn

3.3 Organize mathematical thinking through communication
Met Not Met
jn

3.4 Analyze and evaluate the mathematical thinking and strategies of others.
Met Not Met
jn

Standard 3 comments:
Assessment 2 is aligned with indicators 3.2, 3.3, and 3.4. However, it does not show that candidates communicate mathematical thinking to peers and faculty in their own content learning, so it is not aligned with indicator 3.1. There are data from the 2011-2012 academic year.
In revised Assessment 3, MATH 384 and MATH 230 meet indicators 3.1, 3.2, 3.3, and 3.4.
For Assessment 5, alignment between the assessment and the indicators addressed must be clearly shown in each assessment’s description and within scoring guides or rubrics for this standard.
Assessment 4 addresses each indicator and data were presented on the revised assessment. Alignment between the assessment descriptors and specific NCTM indicators should be clearly shown.

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
jn

4.2 Recognize and apply mathematics in contexts outside of mathematics.
Met Not Met
jn

4.3 Demonstrate how mathematical ideas interconnect and build on one another to produce a coherent whole.
Met Not Met
jn

Standard 4 comments:
Indicators 4.1 and 4.2 were met in the 2/1/2011 report.
Revised Assessment 2 is aligned with indicator 4.3 and data are presented.
Revised Assessment 4 presents data for these indicators. Alignment between the assessment descriptors and specific NCTM indicators should be clearly shown.
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.

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

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

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Standard 5 comments:
All indicators from Standard 5 were met in the 2/1/2011 report.
Revised Assessment 4 meets these indicators and data are presented. Alignment between the assessment descriptors and specific NCTM indicators should be clearly shown.
For revised Assessment 5, alignment between the assessment and the indicators addressed must be clearly shown in each assessment’s description and within scoring guides or rubrics for this standard.


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.

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Standard 6 comments:
Indicator 6.1 was met in the 2/1/2011 report.
Revised Assessments 4 and 5 address 6.1. Data are presented. See comments regarding these assessments in Standard 1.

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

**Indicators:**

7.1 **Attention to equity**

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7.2 **Use of stimulating curricula**

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7.3 **Effective teaching**

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7.4 **Commitment to learning with understanding**

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7.5 **Use of various assessments**

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7.6 **Use of various teaching tools including technology**

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**Standard 7 comments:**

*Indicators 7.2, 7.3, and 7.4 were met in the 2/1/2011 report. Revised Assessment 2 is aligned with indicators 7.1 and 7.5, and data are presented. In revised Assessment 3, EDUC 340 and EDUC 450 meet indicator 7.1, EDUC 330 meets 7.5, and EDUC 384 and EDUC 310 meet indicator 7.6. Revised Assessment 4 is aligned with Standard 7 indicators and data are presented. Revised Assessment 5 addresses indicators 7.1-7.6 and data are presented. See comments regarding Assessments 4 and 5 in Standard 1.***

**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.

8.2 Select and use appropriate concrete materials for learning mathematics.
Met Not Met
jn jn

8.3 Use multiple strategies, including listening to and understanding the ways students think about mathematics, to assess students’ mathematical knowledge.
Met Not Met
jn jn

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
jn jn

8.5 Participate in professional mathematics organizations and uses their print and on-line resources.
Met Not Met
jn jn

8.6 Demonstrate knowledge of research results in the teaching and learning of mathematics
Met Not Met
jn jn

8.7 Use knowledge of different types of instructional strategies in planning mathematics lessons.
Met Not Met
jn jn

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
jn jn

8.9 Develop lessons that use technology’s potential for building understanding of mathematical concepts and developing important mathematical ideas.
Met Not Met
jn jn

Standard 8 comments:
Indicators 8.3 and 8.7 met in 2/1/2011 report.
Revised Assessment 2 is aligned with indicators 8.1, 8.4, 8.6, and 8.8, and data are presented. Revised Assessment 3 is aligned with 8.1, 8.2, 8.4, 8.6, and 8.9. Data are presented. Revised Assessment 4 is aligned with indicators in Standard 8, though it's not clear how 8.5 is assessed as met for all. Data are presented. Revised Assessment 5 provides data for indicators for Standard 8, though not all candidates achieved passing scores for 8.5. See comments regarding Assessments 4 and 5 in Standard 1.

In Assessment 3, EDUC 340 and EDUC 384 together meet indicator 8.1; EDUC 384 meets indicators 8.2, 8.4, 8.5, 8.6, 8.8, and 8.9; and EDUC 310 meets indicator 8.9. In Assessment 3, there is not enough information to determine that MATH 380 aligns with indicator 8.4 with its emphasis on mathematics standards and mandates.

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 involving integers, rational, real and complex numbers.
Met Not Met
jn jn

9.2 Use properties involving number and operations, mental computation, and computational estimation.
Met Not Met
jn jn

9.3 Provide equivalent representations of fractions, decimals, and percents.
Met Not Met
jn jn

9.4 Create, solve, and apply proportions.
Met Not Met
jn jn

9.5 Apply the fundamental ideas of number theory.
Met Not Met
jn jn

9.6 Makes sense of large and small numbers and number systems.
Met Not Met
jn jn

9.7 Compare and contrast properties of numbers and number systems.
Met Not Met
jn jn
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:**
All indicators except 9.10 were met in the 2/1/2011 review. This indicator remains unmet.
Revised Assessment 3 continues to explicitly meet 9.1 and 9.3.

**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.

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

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**Standard 10 comments:**

| Indicators 10.1-10.3 met in 2/1/2011 report. |
| Revised Assessment 4 is an assessment of teaching rather than an assessment of candidates' content knowledge. |
| No new evidence is found to support indicators 10.4, 10.5, and 10.6. |

**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.

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

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11.3 Analyze characteristics and relationships of geometric shapes and structures.

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

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

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

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

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

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**Standard 11 comments:**

No new evidence is found to support 11.4, 11.5, 11.7, and 11.8. |

**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.

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

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

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

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

| Met | Not Met | jn | jn |

**Standard 12 comments:**

| Indicators 12.1-12.4 met in the 2/1/2011 review. |
| No new evidence is found to support indicator 12.5. |


**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 | jn | jn |

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

| Met | Not Met | jn | jn |

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

| Met | Not Met | jn | jn |

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

| Met | Not Met | jn | jn |

**Standard 13 comments:**

| Indicator 13.3 was met in the previous review (2/1/2011). |
| Assessment 3 and MATH 230 meets indicators 13.1 and 13.2. |
| No evidence is found to support indicator 13.4. |


**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
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.

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

14.4 Use statistical inference to draw conclusions from data.

14.5 Identify misuses of statistics and invalid conclusions from probability

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.

14.7 Determine and interpret confidence intervals.

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

Standard 14 comments:
No evidence is found to support indicators 14.5 and 14.8.

**Indicators:**

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

```
Met Not Met
jn jn
```

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

```
Met Not Met
jn jn
```

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

```
Met Not Met
jn jn
```

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

```
Met Not Met
jn jn
```

**Standard 15 comments:**

Indicators 15.1 and 15.2 met in the 2/1/2011 review. No new evidence is found to support indicators 15.3 and 15.4.

**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
jn jn
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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
jn jn
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16.3 Demonstrate the ability to increase students’ knowledge of mathematics.

```
Met Not Met
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Standard 16 comments:
Indicators 16.1 and 16.2 met in 2/1/2011 review. Revised Assessments 4 and 5 address indicator 16.3. Data are presented for both assessments. See comments regarding Assessments 4 and 5 in Standard 1.

PART C - EVALUATION OF PROGRAM REPORT EVIDENCE

C.1. Candidates’ knowledge of content
Revised Assessment 3 provides further evidence of candidates’ knowledge of mathematics. Also, 1-2 administrations reflect new (revised) data to address unmet indicators.

C.2. Candidates’ ability to understand and apply pedagogical and professional content knowledge, skills, and dispositions
Revised Assessments 3, 4, and 5 directly and honestly address concerns from the previous review. As per the requirements, 1-2 administrations of data indicate implementation of new assessments and explicit assessments of indicators.

C.3. Candidate effects on P-12 student learning
Addressed in previous report (2/1/2011).

PART D - EVALUATION OF THE USE OF ASSESSMENT RESULTS

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)
Section VI shows that the Unit has used assessments and the SPA review process to improve and strengthen their program in many ways. This is clear in the thoughtful and conscientious ways the unit has addressed NCTM concerns, with concomitant attention to the IL standards.

PART E - AREAS FOR CONSIDERATION

Areas for consideration
Attention to the historical development of mathematics was noticeably absent. Developing an assessment that directly targets the historical development of mathematics with contributions from diverse cultures would enhance candidates' content knowledge and target many unmet indicators.

PART F - ADDITIONAL COMMENTS

F.1. Comments on Section I (Context) and other topics not covered in Parts B-E:
The unit is to be commended for submitting a strong program report in response to the 2011 feedback. It is clear that feedback was considered and assessments revised in a very responsible way. The faculty is highly qualified as well.

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