

## Section IV Evidence for Meeting Standards

### #7 Optional Course Grades

#### 1. Description of Course Grades in major courses

Course grades are included for the courses required of all candidates: the Calculus sequence (MATH 212 Calculus I, MATH 213 Calculus II, and MATH 314 Calculus III), Proof (MATH 300 Bridge to Advanced Mathematics), Linear and Abstract Algebra (MATH 315 Linear Algebra and MATH 432 Introduction to Abstract Algebra), Geometry (MATH 324 College Geometry), Probability and Statistics (MATH 240 Statistical Methods I and MATH 441 Introduction to Probability), Number Theory (MATH 431 Number Theory), and History of Mathematics (MATH 458 History of Mathematics). Because candidates choose between Operations Research and Discrete Mathematics (MATH 418 Introduction to Operations Research and MATH 436 Discrete Mathematics) those courses are not included in this section.

#### 2. Alignment of Courses with NCTM Standards and Indicators

Alignment of Courses Content with NCTM Standards and Indicators	
Calculus (MATH 212, 213, 314)	1.1, 1.2, 3.1, 3.2, 3.3, 4.1, 4.3, 5.1, 5.2, 5.3, 6.1, 10.1, 10.4, 10.5, 12.1, 12.2, 12.3, 12.4, 12.5
Proof (MATH 300)	2.1, 2.2, 2.3, 2.4, 3.1, 3.2, 3.3, 9.5, 9.7
Linear and Abstract Algebra (MATH 315 and 432)	1.1, 1.2, 2.3, 2.4, 3.1, 3.2, 3.3, 4.1, 4.3, 5.1, 5.2, 5.3, 6.1, 9.1, 9.7, 9.9, 10.1, 10.2, 10.3, 10.4, 10.5, 10.6, 13.1, 13.2, 13.3
Geometry (MATH 324)	1.3, 2.1, 2.2, 2.3, 2.4, 3.1, 3.2, 3.3, 4.1, 4.2, 6.1, 11.1, 11.2, 11.3, 11.4, 11.5, 11.6, 11.7, 11.8, 15.1
Probability and Statistics (MATH 240 and 441)	1.1, 1.2, 2.2, 2.3, 3.1, 3.2, 3.3, 4.2, 5.1, 6.1, 9.4, 14.1, 14.2, 14.3, 14.4, 14.5, 14.6, 14.7, 15.2
Number Theory (MATH 431)	1.1, 2.1, 2.2, 2.4, 3.1, 3.2, 5.2, 9.1, 9.5, 9.7, 4.1
History of Mathematics (MATH 458)	2.1, 3.1, 3.2, 4.3, 9.7, 9.10, 10.6, 11.8, 12.5, 13.4, 14.8, 15.4

#### 3. Data Results

Every candidate who completes the program has earned a minimum 2.5 grade point average (GPA) in required mathematics courses. Per College policy, candidates are able to retake courses (one repeat; additional repeats require a petition) to improve their grade. The initial grade remains on the transcript with a notation that the course has been repeated; the quality points from the retaken course used in calculating GPA Calculations adhere to College policy. Candidates admitted to the program as of September 2009 are required to earn a minimum 2.75 GPA in required mathematics courses with the number of repeated courses limited to four in order to enter Practicum and continue to student teaching. The change in policy was requested by mathematics education faculty who observed that candidates with lower GPA in mathematics courses were less able to transfer their content knowledge into mathematics for teaching.

#### 4. Data Interpretation

Faculty who teach common courses use a grading rubric that was developed collaboratively. Since course grades are based on multiple assessments during the course, the average provides a reliable indication of the candidate's knowledge of undergraduate level mathematics. The breadth of Indicators from the NCTM Standards contained in these common courses provides evidence of preparation that candidates receive to teach secondary level mathematics.

#### 5. Assessment Documentation for Course Grades

##### a. Course Descriptions for the required courses are presented:

**MATH 212: Calculus I**

4 credit hours

This course covers the fundamental concepts, techniques, and applications of the differential calculus of one variable and begins the study of integration.

**MATH 213: Calculus II**

4 credit hours

A continuation of MATH 212, topics include derivatives and integrals of logarithmic, exponential, and inverse trigonometric functions; techniques of integration; infinite series; and related applications.

**MATH 314: Calculus III**

4 credit hours

A continuation of MATH 213, this course covers three dimensional analytic geometry, elementary vector analysis, functions of several variables, partial differentiation, and multiple integration.

**MATH 300: Bridge to Advanced Mathematics**

3 credit hours

The standard techniques of deductive proof in mathematics are applied to basic results regarding sets, relations, functions, and other topics.

**MATH 315: Linear Algebra**

3 credit hours

Matrices, linear systems, vector spaces, vector geometry, linear transformations, and appropriate applications are covered.

**MATH 432: Introduction to Abstract Algebra**

3 credit hours

The definitions and properties of groups, rings, and fields are studied. Properties of familiar number systems are exhibited as special cases of these more general and abstract systems.

**MATH 324: College Geometry**

4 credit hours\*

Advanced topics in Euclidean geometry are considered using synthetic, analytic, vector, and transformational formats. Included are axiomatics and non-Euclidean geometry, topics in logic, and methods of proof appropriate for geometry.

\*Increased from 3 credit hours beginning Spring 2011

**MATH 240: Statistical Methods I**

3 credit hours

This is an introduction to measures of central tendency and variability, estimation and tests of significance, and regression and correlation. Lecture and laboratory.

**MATH 441: Introduction to Probability**

3 credit hours

Topics include the development of both discrete and continuous probability theory, combinatorics, mathematical expectation, joint distributions, and sampling distributions.

**MATH 431: Number Theory**

3 credit hours

Topics include number systems, divisibility, primes and factorization, Diophantine problems, congruences, and Euler's and Fermat's Theorems.

**MATH 458: History of Mathematics**

3 credit hours

The history of mathematical thought and the development of mathematics from ancient to modern times are studied.

**b. Scoring Guide for Course Grades**

See attached file: CourseGradeRubrics.doc

**c. Data for Completers (BA and RITE candidates) from Course Grades**

For each program completer course grades were entered to determine distribution and average grade in each required course by year and cohort (BA or RITE.). In addition, the GPA in these courses was computed for each candidate. Grades that were transferred into the program are included here; however, among the 30 candidates represented here, there are only fifteen such grades. The two instances of AP credit in Calculus I by completers are not recorded as grades.

The College translates letter grades as follows: A (4.0), A- (3.67), B+ (3.33), B (3.0), B- (2.67), C+ (2.33), C (2.0), C- (1.67), D+ (1.33), D (1.0), D- (0.67), F (0.0). In the table below, letter categories were collapsed by letter; mean scores for each course were calculated with actual point values.

<b>Grades in Eleven Required Mathematics Courses – Completers</b>							
<b>Minimum Grade to Pass a Course is D-</b>							
<b>2007-2008 BA candidates (n = 14)</b>							
Course/Grade	A	B	C	D	F	Mean (n)*	Range
Calculus I	3	6	3	0	0	3.15 (12)	2.33 – 4.0
Calculus II	4	3	6	0	0	2.85 (13)	2.0 – 4.0
Calculus III	4	6	3	0	0	3.05 (13)	2.0 – 4.0
Bridge (Proof)	3	5	5	1	0	2.71 (14)	1.33 - 4.0
Linear Algebra	11	2	0	0	0	3.872 (13)	3.33 - 4.0
Abstract Algebra	4	8	2	0	0	3.17 (14)	2.33 - 4.0
Geometry	10	3	1	0	0	3.572 (14)	2.33 - 4.0

Statistics	10	2	1	0	0	3.641 (13)	2.0 – 4.0
Probability	4	6	3	0	0	2.98 (14)	1.67 - 4.0
Number Theory	7	4	3	0	0	3.31 (14)	2.0 – 4.0
Hist. of Math.	4	5	3	2	0	2.81 (14)	0.67 - 4.0
*One candidate was in the second degree program (held a Ph. D. in Chemistry) and was not required to take some courses. One candidate had AP credit in Calculus I.							
<b>2007-2008 RITE Candidates (n = 2)</b>							
Course/Grade	A	B	C	D	F	Mean (n)**	Range
Calculus I	2	0	0	0	0	4.0	
Calculus II	2	0	0	0	0	4.0	
Calculus III	1	1	0	0	0	3.5	3 – 4.0
Bridge (Proof)	2	0	0	0	0	4.0	
Linear Algebra	1	1	0	0	0	3.34	3.0 – 3.67
Abstract Algebra	1		1	0	0	2.84	1.67 – 4.0
Geometry	2	0	0	0	0	4.0	
Statistics **	0	1	0	0	0	3.33	
Probability	1	1	0	0	0	3.67	3.33 – 4.0
Number Theory	2	0	0	0	0	4.0	
Hist. of Math.	2	0	0	0	0	4.0	
**One candidate held a degree in Economics and was not required to take this course.							
<b>2008-2009 BA candidates (n = 6)</b>							
Course/Grade	A	B	C	D	F	Mean (n)	Range
Calculus I	1	4	1	0	0	3.0 (6)	2.33 – 3.67
Calculus II	3	1	2	0	0	3.11 (6)	2.0 – 4.0
Calculus III	1	2	3	0	0	2.78 (6)	2.0 – 4.0
Bridge (Proof)	2	2	2	0	0	2.89 (6)	1.67 – 3.67
Linear Algebra	4	2	0	0	0	3.28 (6)	2.67 – 4.0
Abstract Algebra	2	2	2	0	0	2.39 (6)	2.0 – 4.0
Geometry	3	3	0	0	0	3.45 (6)	2.67 – 4.0
Statistics	1	5	0	0	0	3.33 (6)	3.0 – 4.0

Probability	0	5	1	0	0	2.83 (6)	2.0 – 3.0
Number Theory	1	5	0	0	0	3.22 (6)	2.67 – 4.0
Hist. of Math.	0	5	1	0	0	2.94 (6)	2.33 – 3.33
<b>2009-2010 BA candidates (n = 8)</b>							
Course/Grade	A	B	C	D	F	Mean (n)***	Range
Calculus I	3	1	2	0	0	3.11 (6)	2.0 – 4.0
Calculus II	2	1	4	0	0	2.71 (7)	2.0 – 4.0
Calculus III	2	3	2	0	0	2.91 (7)	1.67 – 4.0
Bridge (Proof)	2	4	1	1		2.92 (8)	1.33 – 4.0
Linear Algebra	5	2	1	0	0	3.5 (8)	2.0 – 4.0
Abstract Algebra	0	2	4	2	0	1.79 (8)	0.67 – 3.0
Geometry	2	3	3	0	0	3.04 (8)	2.33 – 4.0
Statistics	5	0	2	0	0	3.04 (7)	2.33 – 4.0
Probability	1	2	4	1	0	2.33 (8)	1.33 – 4.0
Number Theory	4	3	1	0	0	3.29 (8)	1.67 – 4.0
Hist. of Math.	4	3	1	0	0	3.33 (8)	2.33 – 4.0
	***One candidate was in the second degree program (held a degree in Physics) and was not required to take some courses. Another had AP credit for Calculus I.						